

WESTERN INDUSTRY



• It's necessary to make pails to put things in if Western manufacturers make things to put in pails. For details see page 5.

METALS NUMBER What's Ahead in Western Metal Working Industries; Questions and Answers from American Society for Metals Chapter Chairmen on Trends; Nodular Iron Castings; Shine on Stainless Steel; Fabricating Aluminum Products; Hot Dip Galvanizing; Specification Zinc Base Alloys; Metallurgical Insurance; Labor News

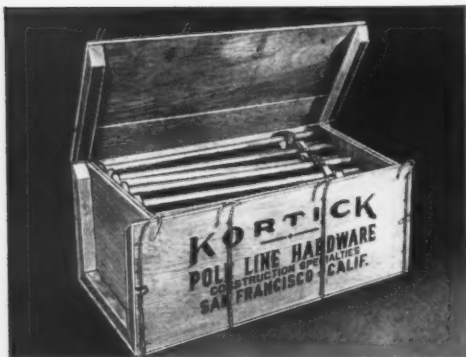
Thirty-Five Cents

VOLUME XIV

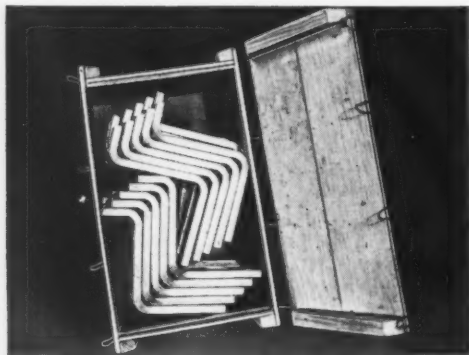
NUMBER 9

September, 1949

SAVES FOR AN ENTIRE INDUSTRY!



HEAVY BOLTS—75 pounds of them, ship safely, securely in a Cabco all-bound weighing barely 4 pounds.



SHIFTING of load inside container makes little difference to Cabco all-bound. No nails to work loose; steel wire holds container securely together, prevents loss.



WAREHOUSING is simple with Cabco all-bounds. They stack neatly, palletize easily, have cleats for manual handling. Ready instantly to fill an order, or go out on the job.

POLE LINE HARDWARE INDUSTRY STANDARDIZES ON WIRE-BOUND BOXES FOR HEAVY, BULK SHIPMENTS

As a result of 3 years of research and study, the pole line hardware industry has standardized on wire-bound wooden containers for bulk shipments of heavy castings and forgings. Here's what Kortick Manufacturing Co., San Francisco, says about the changeover:

"Our new containers, made for us by Cabco, average 4 pounds against the 8-pound nailed crate we once used. Since we ship actual weight, this is important. We once used 28 different nailed crates; now 15 Cabco all-bounds do the job better and cost less. Packing time is less too, and since tops don't have to be nailed shut, we can leave crates open for last-minute inspection without delaying loading. The Cabco all-bound has no nails to work loose, so even if the load shifts inside, the container stays solidly together. And these boxes handle and stack better than any container we've ever used!"

IN MANY OTHER INDUSTRIES,

from Fruit & Produce to Consumer Durables, shippers have enjoyed similar economies with light, strong Cabco all-bounds—a product of the West's oldest, foremost manufacturer of wooden containers.

Find out how Cabco all-bounds can help you! Investigate Cabco's container design service. Write direct to exclusive sales agents:

DUFF CALIFORNIA CO.

Sawn Shook, Barrels, Veneer Covers and All-Bound Containers
100 Bush Street, San Francisco 4, California • Telephone SUtter 1-2260
2581 E. Eighth Street, Los Angeles 23, Calif • Telephone ANgelus 1-4161

CABCO
CONTAINERS
THIS IS OUR 66TH YEAR

CALIFORNIA BARREL COMPANY, LTD.

OFFICES: SAN FRANCISCO, LOS ANGELES and ARCATA, CALIFORNIA
SALT LAKE CITY, UTAH • PLANTS: ARCATA, SAN FRANCISCO, LOS ANGELES

Brown of Philadelphia makes unexpected triple play

1 Abolishes costly rejects

2 Eliminates unit air testing

3 Saves 16% on machining



Base for Throttling and Reset Type Air-Actuated Control Unit

Non-Bleed, Pilot Relay Valve Body. Illustrations are approximately three-quarters actual size.



When Anaconda Die Pressed Brass Forgings replaced sand castings for these two all-important parts of Brown Air Operated Controllers, the play was for a single out — elimination of “leakers” — which, on occasion, ran as high as 60% on underwater air tests and showed up only after complete machining. Naturally, when wrought metal replaced the sand castings, “leakers” were out by a mile — so completely out that costly unit air testing was found to be unnecessary.

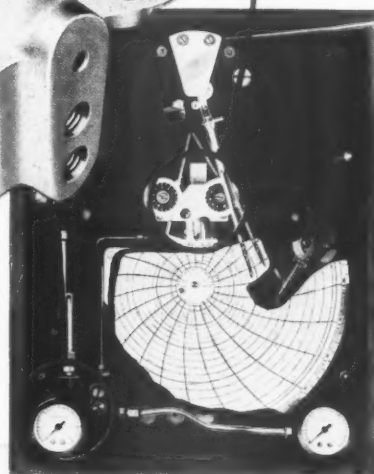
That was more than nine years ago, and of the tens of thousands of forgings used in the meantime, nary a one has been thrown out for porosity.

Savings? Plenty — in time and temper — and in cold cash, too. For instance: 16% on combined tooling and machining costs for the base forging alone . . . and that is only one of the many Anaconda Die Pressed Brass Forgings now being used in Brown Instruments.

There are a lot of things about Anaconda Die Pressed Forgings you'll want to know. Publication B-9 goes into detail, telling where, why, how and when. Write for a copy today. Address, The American Brass Company, General Offices: Waterbury 88, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.



49108



BROWN

This is the Brown AIR-O-LINE Recording Flow Controller, manufactured by the Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia. Brown Air Operated Instruments are used the world over for automatically controlling temperature, pressure, flow, liquid level and humidity in industrial processes.

Anaconda
DIE PRESSED FORGINGS



Don't just pick
any wire

Let us make it to fit the job exactly

Here in the mills of The American Brass Company, more than 100 different copper alloys are processed into wire in an almost unlimited variety of sizes and shapes, tempers and finishes. The result is that each wire is, in effect, tailor-made . . . especially adapted to particular problems of tooling, rate of production, and desired properties of the finished product. And there's a big difference—both in quality and unit cost—when the wire is exactly suited to the job!

The column at the right very likely holds the combination to that "one best wire". Our Technical Department will help you find it—and it may be easier than you think. Your inquiry entails no obligation whatever.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: Anaconda American Brass Ltd., New Toronto, Ont.



Anaconda
COPPER and COPPER ALLOY
Wire

TYPICAL TYPES OF WIRE

Pin Wire	Hook & Eye Wire	Nail Wire
Screw Wire	Cotter Pin Wire	Rivet Wire
Chain Wire	Brake Lining Wire	Tie Wire
Slide Fastener Wire	Fourdrinier Wire	Welding Wire
Jewelry Wire	Trolley Wire	Brazing Wire

MATERIALS

Copper	Brass	*Hitensu Cadmium
Chromium Copper	Zinc	Bronze
Deoxidized Copper	Phosphor Bronze	*Calsun Bronze
Silver Bearing Copper	Nickel Silver	Ambraloy
Gilding	Cupro Nickel	Special Copper Alloy
Commercial Bronze	*Everdur	*T.M. Reg. U.S. Pat.

SIZES AND SHAPES .002" TO .750"

(Extreme limitations—varying according to alloy and shape)

Round	Half-oval	Square
Half-round	Flat	Hexagonal
Oval	Keystone	Octagonal
	Irregular Shapes on Order	

FINISHES AND TEMPERS

Cadmium Plated	Bare	Oxidized
Bright Annealed	Tinned	

From Soft Annealed through Spring Tempers; put up on Spools, Reels, Coils or cut to Straight Lengths.

SUITABLE FOR THESE FABRICATING OPERATIONS

Redrawing	Riveting	Braiding
Cold Heading	Machining	Spinning
Hot Heading	Flat rolling	Waving
Extruding	Edgewise winding	

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Metals Issue

WESTERN INDUSTRY

VOLUME XIV

SEPTEMBER, 1949

NO. 9

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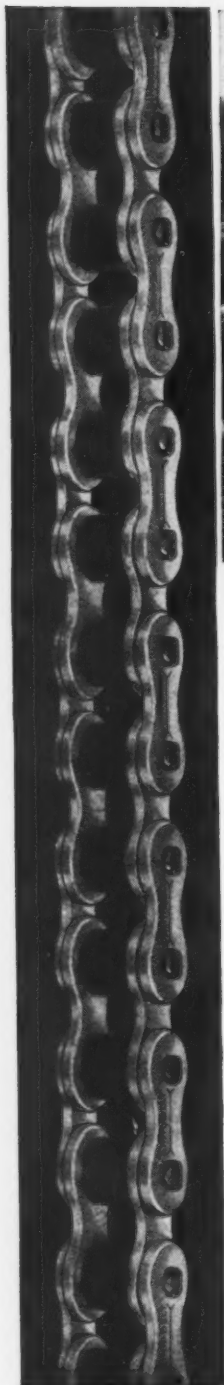
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Front Cover

As population in the West continues to increase, its needs for all sorts of fabricated metal products become greater and more diversified, and the number and size of manufacturing plants to supply these needs grows. Scene shows one of the operations in making pails at Rheem Manufacturing Co., Richmond, Calif.

How Link-Belt Chain and Gear Drives Take a Rough Ride "In Stride"



Severe Service Proves Outstanding Advantages of Link-Belt Roller Chain and Worm Gear Drives

Driving the drum of a concrete mixer is rugged service, imposing heavy demands on the power transmission, so builders of the Challenge Mixer chose Link-Belt chain and worm gear speed reducer for this important application.

Cook Brothers Equipment Company, exclusive distributors for the western states, report several advantages of this form of drive. The chain drive provides the three point suspension, as compared with the gear driven drum which necessitates a fourth point and introduces a binding action as the frame is forced out of alignment due to road conditions. Chain drive provides a definite cushioning effect for the engine, absorbing shocks from sudden starts and stops of a loaded drum, vibration and road shock, all of which have ruinous effect on gears, bearings and shaft.

Chain, after long service is easy and economical to replace in comparison with gears.

Chain provides a complete and constant application of flexible power, because it wraps more than half-way around the drum and 40% around the driving sprocket.

The Link-Belt worm gear speed reducer is a compact, durable and efficient unit, especially adapted to places where high ratio reduction in small space is important.

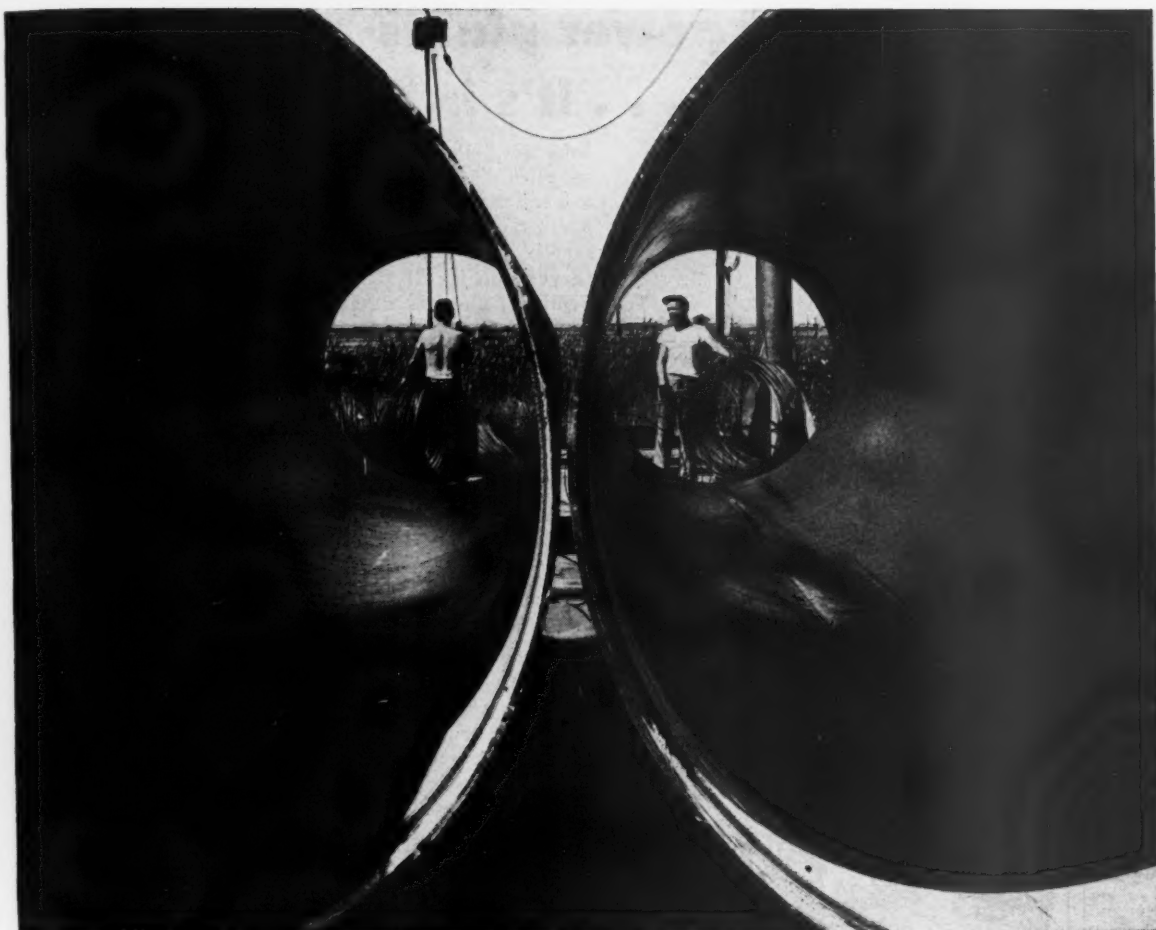
When power transmission is your problem, consult Link-Belt. Whatever the specific need, Link-Belt gearmotors, worm gear or herringbone gear speed reducers, P.I.V. Variable Speed Drives, roller and silent chain drives are satisfying the exacting demands of designers and manufacturers in every field.

LINK-BELT

Power Transmission Machinery
"THE COMPLETE LINE"

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PACIFIC DIVISION

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San Francisco 24, Los Angeles 33, Seattle 4,
Offices and Factory Branch Stores at Portland 9,
Spokane 13, Oakland 7. 11,341-P



Giant steel pipe—of $\frac{1}{2}$ " U.S.S. Steel plate mortar lined, wire wrapped and mortar coated—forms an 81-mile long artery pouring water from the Pardee Reservoir on the Mokelumne River to the eastern border of San Francisco Bay. Here you see it after the $\frac{1}{2}$ " cement mortar lining has been applied by centrifugal force. In the background, workmen are preparing to wrap the pipe with $\frac{1}{4}$ " steel rod to bond the outer cement coating in place.

Steel is building the West *for today—for the future*

If it's a job demanding strength and speed, it's a job for steel. And versatile steel is filling the bill in countless jobs, large and small, in the West today. Columbia combines its own modern facilities with others in the Industrial Family that Serves the Nation... facilities which have expanded to meet our nation's postwar needs. Just the right steel for your job is now ready for delivery. Get in touch with your nearest Columbia Steel Company office.

Only STEEL can give you all 7 of these structural advantages: Extra toughness and shock resistance—Incombustibility—High strength-weight ratio—Highest modulus of elasticity—Versatility of application—Great durability—Ultimate economy.



On the site, the 30' sections are lowered into place and joined by arc welding. Each section weighs some $7\frac{1}{2}$ tons, is large enough for a man to walk through. The second Mokelumne project is now completed... delivering 50 millions of gallons daily. Ultimate capacity: 118 million.



Columbia Steel Company

San Francisco Los Angeles Portland Seattle Salt Lake City

UNITED STATES STEEL

If it's piping for power plants

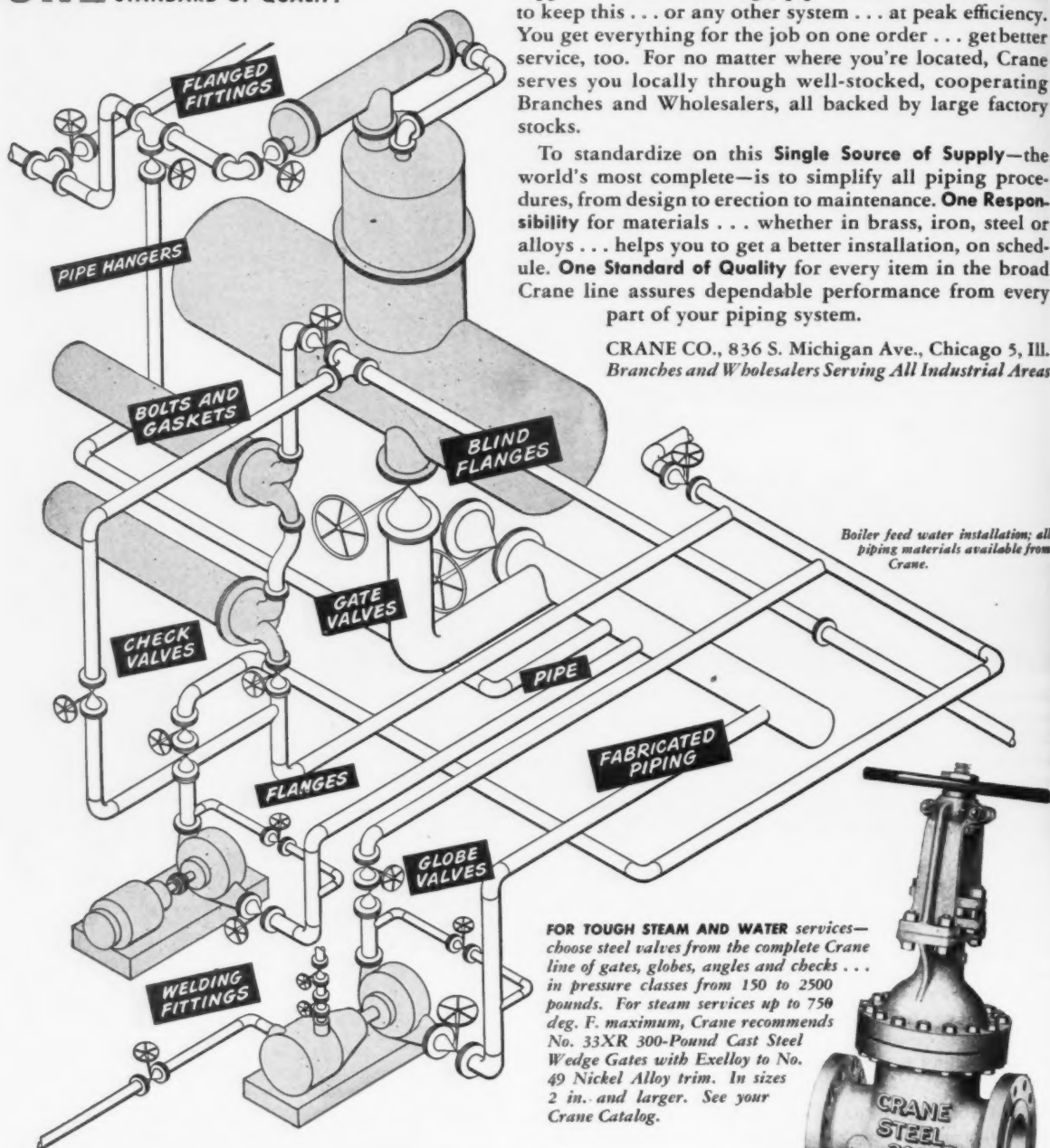
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netically, for smoother, more positive control. And you have the convenience of AC power. Get the facts about this important Added Value, offered only by P&H—America's leading crane builder.

*T. M. of Harnischfeger Corporation for electro-magnetic type brake.



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CRANE CONTROL
ANOTHER
P&H
ADDED VALUE

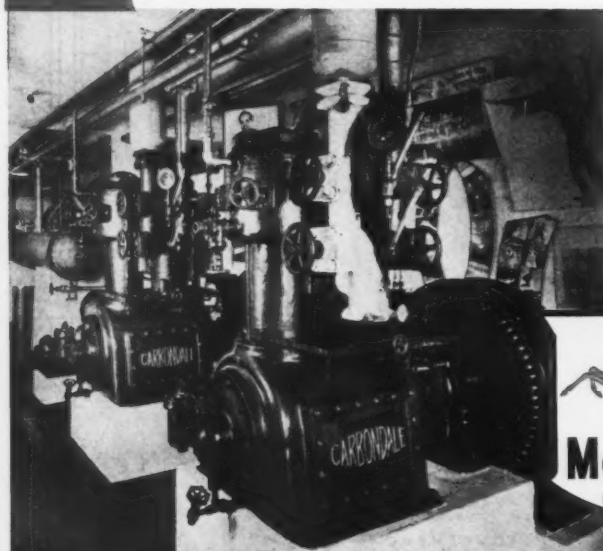
OVER 16,000 P&H CRANES SERVE AMERICAN INDUSTRY...FAR MORE THAN ANY OTHER

Dependable Lubrication

KEEPS THE



G. P. representative F. E. Sheehan discusses lube equipment with Chief Engineer, Tom Fredericksen of San Francisco's Winterland Ice Palace.



The Carbondale Refrigeration plant.

Trouble-free equipment performance at San Francisco's Winterland has kept Ice Hockey teams, pleasure skaters, and the Famous Ice Follies, on ice for eleven years without a holdup. The refrigeration plant which operates sixteen hours a day every day consists of two 10 by 10 Carbondale Ammonia Refrigeration Compressors. Lubricated with General Petroleum's Gargoyle Arctic Oil C Heavy, they have not required ring replacements in the entire eleven years of operation. According to Chief Engineer Tom Fredericksen, recent examination of the equipment showed bearings, pistons, crankshaft, con rods and cylinders in almost perfect condition. Cylinders did not exceed three to four thousandths out of round and no scoring was evident.

This lubrication record strongly demonstrates Gargoyle Arctic's characteristics... free flowing at extremely low temperatures, it causes no restriction in expansion coils or condensers.

It resists formation of gums, lacquers and carbons, has high lubricity at all temperatures.

The preventive maintenance program followed from G. P. recommendations has resulted in performance true to the tradition of show business... where the show must go on.



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The G. P. Lube-Engineer is an expert trained to save you money through proper lubrication. The preventive-maintenance program he will put into effect for your equipment will result in longer machinery life, simplified lubrication methods, less buying and stocking problems.



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for this spot?



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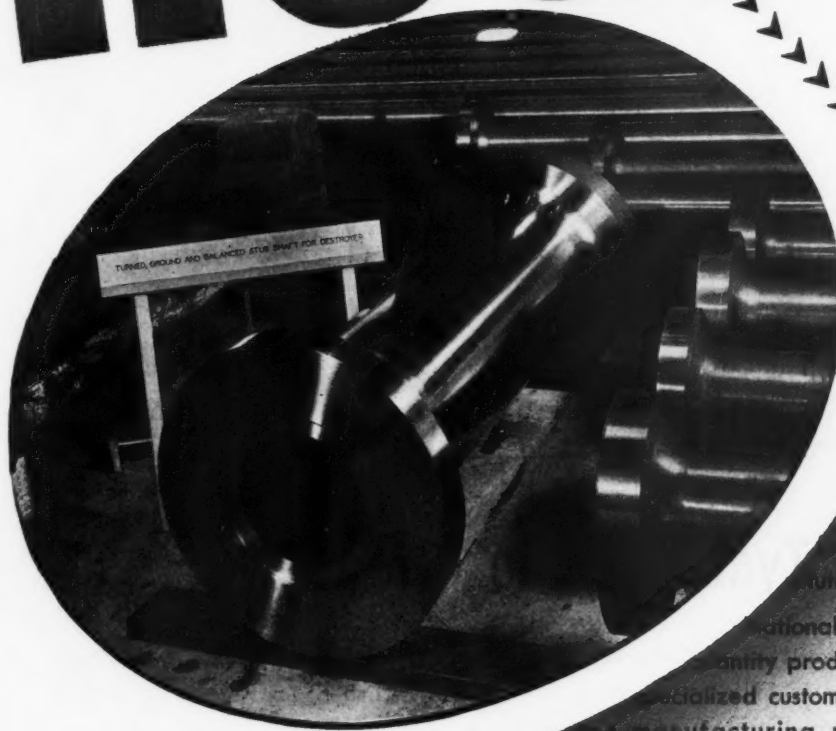
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heavy

MANUFACTURING

DONE

better



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Here, too, you can get IDEAL Electric Furnace Steels in press forged billets, large bars and open die forgings to 35,000 lbs.



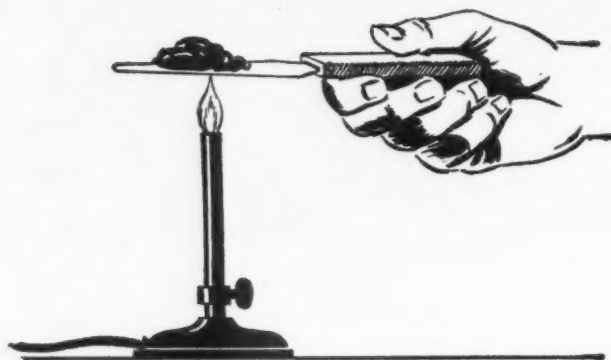
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Industrial Products Division • Torrance, California • Los Angeles Area

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This booklet "From Melting Furnace to Finished Product" illustrates and describes National's Torrance Plant facilities and lists the major plant equipment. It is yours without obligation on request.

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This grease is designed especially for high temperature service. Its high melting point is your guarantee for efficiency. "Alitho" is resistant to both salt and fresh water, and prevents corrosion of metal parts. Unusually high adhesive qualities make it more economical in use as well as better for the maintenance of expensive machinery. Its uniform consistency, achieved through ho-

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Tycol "Alitho" Grease can be used in many applications where other greases cannot be used, or are not as practical or safe. It comes in four grades: 0, 10, 20, and 30. Your nearby Associated Representative can tell you which one best suits any particular job to which you may wish to put it. It will pay you to give him a call.



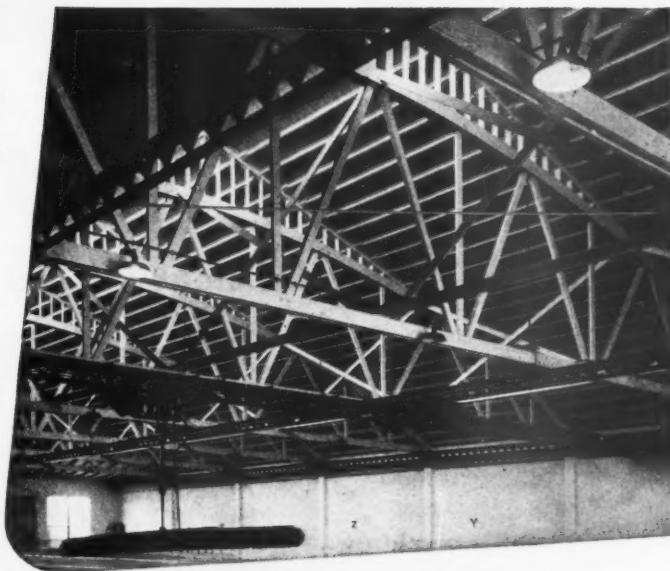
*Ask your Helpful Associated Dealer for an
Associated 1949 Football Schedule*



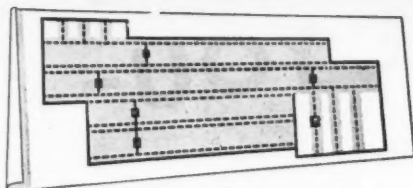
**TIDE WATER
ASSOCIATED
OIL COMPANY**

Interlocking Trambeam Cranes may be used independently or simultaneously. Powered with patented Vari-Pressure Drive units.

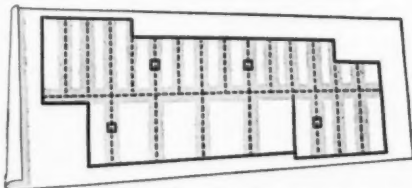
How TRAMBEAM CRANES



Can Cover Every Square Foot of Working Area



Gray areas indicate the typical area coverage given by a Trambeam Crane System



Here is how the same plant might be served by an extensive system of monorails

Where "area coverage" is necessary or desirable, Whiting Trambeam Cranes will supply materials-handling service at lower cost than monorails, which can give only "line coverage."

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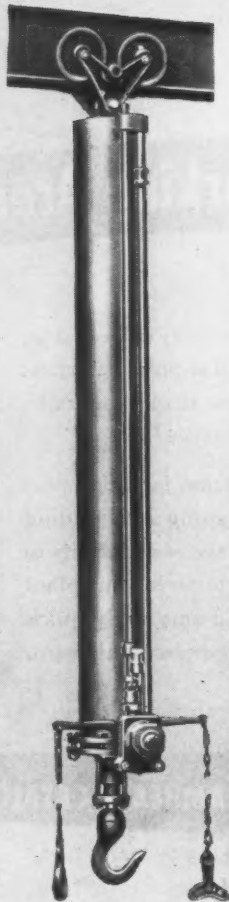
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149-3

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<input type="checkbox"/> Air Cylinders	Firm.....
<input type="checkbox"/> Air Compressors	Street.....
	City.....Zone.....State.....

This oil...



FOR ALL YOUR
PASSENGER CARS
AND
LIGHT TRUCKS

... fights Acid Action of "On and Off" operation THE MAJOR CAUSE OF ENGINE WEAR

Unique "X" Safety Factor in Shell X-100 Motor Oil Counteracts Acid Action

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Shell Research worked all out on this problem . . . developed a unique "X" safety factor to combat Acid Action. Now, 2½ million miles of road testing and millions of miles of use by motorists have proved conclusively that with this "X" safety factor Acid Action is effectively counteracted—engine life is prolonged.

This triumph of Shell Research—another Shell "first"—comes to you only in Shell X-100 Motor Oil. This oil, long famous for its ability to protect your engine under the stresses of sustained high speeds and extreme operating conditions, now gives you this added protection. It is unequalled by any other motor oil, no matter its price.

It's Incomparable!

You'll get prompt, efficient service

...AT OUR PACIFIC COAST GASKET SHOP

OUR improved Pacific Coast facilities at Pittsburg, California, now enable us to give you fast, economical service on many types of Johns-Manville gaskets. Where necessary—and when possible—rush orders are shipped the same day.

The Pittsburg gasket shop is backed by the complete facilities of Johns-Manville—one of the largest and oldest manufacturers of all types of packings and gaskets. Our range of service on specific types of packings and gaskets is, therefore, practically unlimited. Your inquiries are cordially solicited.

Typical gaskets and packings available for prompt delivery from Pittsburg include:

- **Cut gaskets and sheet packings**—including various types of folded gaskets made in a wide range of sizes from a variety of materials
- **Ring gaskets**—both standard and extra heavy ring and full-face gaskets
- **Manhole and handhole gaskets** for every requirement
- **A full range** of tape, groove and door packings

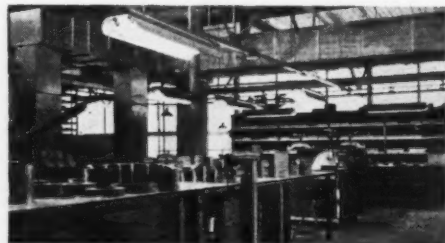
A few of the industries we are equipped to serve are:

Aviation manufacturers, chemical plants, drydocks, electrical utilities, food processors, lumber mills, meter manufacturers, mines, oil equipment manufacturers, oil refineries, paper mills, pipeline operating companies, steamship operators, shipyards, steel mills, sugar refineries, valve manufacturers, water companies, etc.

For further information, write to your nearest Johns-Manville office: 777 Thomas St., Seattle 9; 116 New Montgomery St., San Francisco 5; 816 West 5th St., Los Angeles 13.



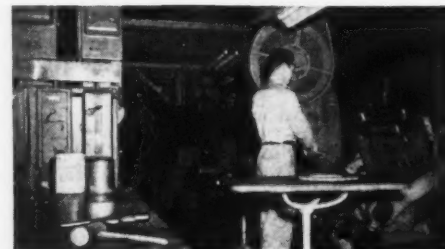
A general view of the Pittsburg gasket shop



The handhole and manhole gasket department



The sorting and packaging department



One of the many presses at Pittsburg

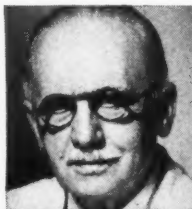
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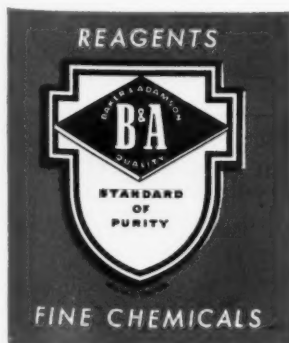


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Smooth bore construction, with mechanical reinforcing wire within the wall of hose. Used principally for gritty, sandy, corrosive fluids.

TOWER SUCTION

Rough bore construction has exposed lining of wire and fabric. Good for heavy service but not recommended for water containing grit or fluids having corrosive properties.



Illustration shows operator anchoring built-in nipples.



Mr. Ray L. Smith, President
Troy Building & Supply Co.
Troy, New York

How to Select Suction Hose for Your Job

● Since long service life has an important bearing on costs far beyond the purchase price of suction hose, consult an experienced Republic distributor.

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This is important, too—for rewiring in existing raceways, the Code recognizes the smaller diameter of Densheath TW and permits more conductors to be pulled in the same size conduit. Here is a typical case—

½" CONDUIT

Type R



3 #10 Wires

Type TW



6 #10 Wires

How MUCH of the electric power you pay for do you *throw over your shoulder* through overloaded, overextended, obsolete, inadequate wiring?*

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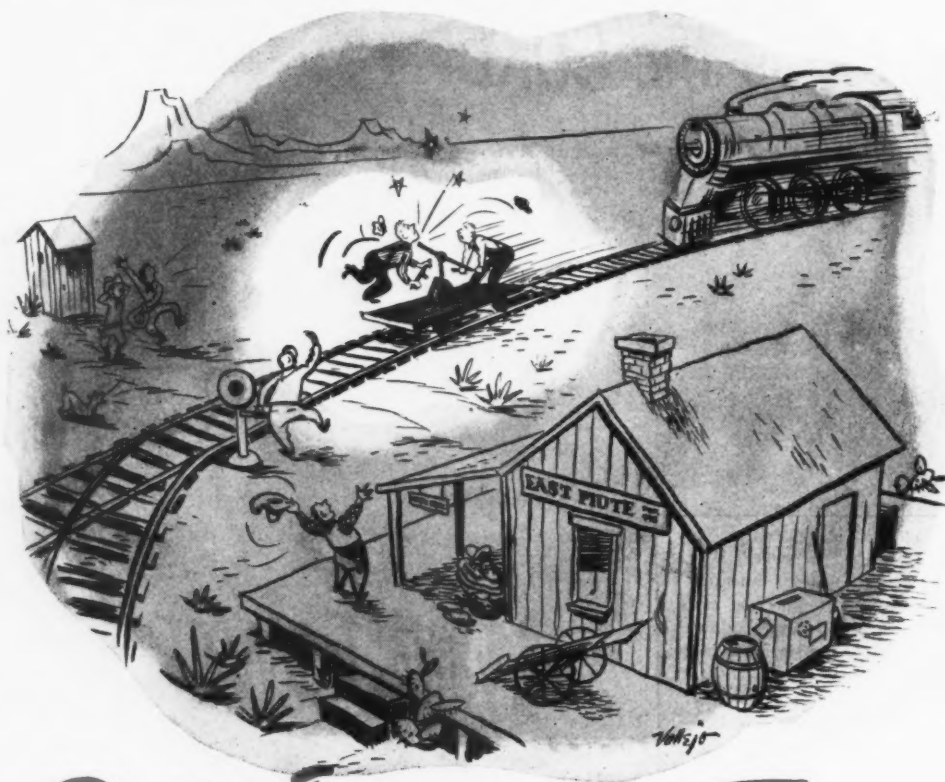
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CHarter 1761

IN OUR MAILBOX

Square Water Heaters

Editor, *Western Industry*:

Concerning the questions asked by H. Vinton Potter, coordinator of Promotion for the American Gas Association, in your July issue, as to why water heaters cannot be made square instead of round, why can they not be more squatty so the flue can be tilted to best advantage, and why cannot remote controls in the kitchen be installed, we are happy to give you our answers.

His questions are not unreasonable, as heaters can be built square instead of round, and have been so built in the past. However, the cost of building a square heater is appreciably more than that of building a round heater, and while this firm has not built square heaters, we have seen other manufacturers do so, and not be able to compete from a matter of price. Under the circumstances, they naturally dropped the square heater in a rather short time. Also the investment in dies and tooling is much higher on a square heater, which of course, means additional cost as well as additional capital and very few people are willing to pay this additional cost, so we have never gone into the subject, as we do not believe it is feasible as explained above.

In regard to his second question, heaters can be built shorter and wider. This also involves a little additional cost for the same size heater, which however, is not nearly as great as the square heater. The difficulty with the short heater, particularly on the Pacific Coast, where probably at least 50 per cent or more do not go in basements, is the fact that when they are built wider, the average house does not have the space to install them, which results in losing sales against a narrower and taller heater. We have found this out through our own experience. This is particularly true on the cheaper houses, as with houses costing approximately \$10 per square foot, nobody wants to provide any more room than necessary for the water heater.

In answer to Mr. Potter's third question about having an adjustment dial in the kitchen, this I imagine could be done. It would again be fairly expensive, and I doubt if there would be one person in 100 that would be willing to go to the additional expense for this convenience. There probably is not one person in 10 that actually changes the temperature setting of their water heater for different purposes. They will have it adjusted, or adjust it themselves to their satisfaction for all around use, and probably never touch it again during the lifetime of the heater. This again seems like an unnecessary expense and would again increase the cost of the heater and decrease its salability due to the increased cost.

B. A. HINCKLEY
President
General Water Heater Corporation
Burbank, California

EDITORIAL COMMENT

"As the Twig Is Bent"

"**A**S the twig is bent, the tree's inclined." Today's economic and educational landscape seems to management's eye to be full of "inclined trees," so much inclined, in fact, that they lean against management's house in increasing number and weight. As each tree sags against the roof or walls, it says "support me."

Some of the "support" is more financial and social benefits for employees, described by union leaders as additional "security," obtained through union bargaining power. Some of it is increasing contributions to a "welfare-minded" government for enterprises ranging all the way from domestic investment banking and gigantic agricultural charity to state trading and betting on Oriental civil conflicts.

Another part of the "support" is a Supreme Court bent on brushing aside time-tested business practices in order to construct economic theories from which it designs intricate patterns of business conduct. And still another "support" is to permit unchallenged a distrustful, skeptical attitude toward business inculcated in schools and colleges, an attitude which proceeds on the assumption that most business practices are fundamentally dishonest except those that have been forced into the straight and narrow path by legislation.

Management spends most of its time worrying about the trees, although it is too late to do anything about most of them, and pays but little attention as to when, where, and by whom the twigs are bent. If management did, it would find that considerable of the twig-bending comes from school and college teachers who have had very little, if any, real opportunity to get an adequate picture of business which would enable them to grasp the fact that its customs and practices have survived the white heat of long experience and consequently cannot be lightly tossed aside.

The fault for this situation lies pretty much at management's door for its indifference and intolerance, but it is not too late for management to get the truth of its position established inside educational portals. It will not be an easy task, nor can it be undertaken except on the highest plane. The electric utilities did industry no good when they introduced gilded pictures of themselves into school textbooks back around 1930. Management has much to be proud of; also much to be ashamed of. It needs to recognize that any attempt to cram both the good and bad down education's throat will not only be wrong but futile. It will have no cause to regret urging only the good.

Unsafe Safety Records

HOW many safety records are obtained by keeping injured people on the job in some form or other, going through the motions of working while one arm is tied up in a sling so as to be able to avoid reporting lost time for them? One observer informs us that such methods may give you a fine showing, but are likely to cause the rest of the workers to say to themselves (or to each other), "If the company is making so much money it can afford to keep them here doing nothing, why can't it afford to pay us more wages?"

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INVENTORY
PROBLEM?**



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FOR STEEL USERS



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UNITED STATES STEEL

THE WESTERN OUTLOOK . . . News . Statistics

1

For West suffers no greater decline than does balance of the country; some lines decidedly better off; Demand for lighter oil products affects production picture; Fewer aircraft; Fresh fruit shipments slump sharply

NO greater decline has taken place in the seven far-western states (Calif., Ore., Wash., Idaho, Utah, Nev., Ariz.) comprising the 12th Federal Reserve District than in the country as a whole, according to the Federal Reserve Bank of San Francisco.

In some lines the slackening up from last year was actually less, and the Bank makes the comparison shown below between the declines from the peak point in the 13-month period between Dec. 1947 to Dec. 1948 to the level reached in April 1949. (In the case of unemployment it is an increase, instead of a decline). The month shown in parenthesis below is the peak point:

Department store sales ¹	
United States (July 1948).....	— 6.7
12th District (April 1948).....	— 6.3
Non-agricultural employment ²	
United States (October 1948).....	— 3.6
12th District (Sept. 1948).....	— 3.3
Manufacturing employment ³	
United States (Sept. 1948).....	— 7.3
12th District (Sept. 1948).....	— 6.4
Lumber production ⁴	
United States (Jan. 1948).....	—19.6
12th District (Dec. 1947).....	—12.3
Insured Unemployment ⁵	
United States (Oct. 1948).....	1147.0
12th District (Sept. 1948).....	1112.3
Commercial, industrial and agricultural loans ⁶	
United States (Dec. 1948).....	— 9.0
12th District (Dec. 1948).....	— 9.2

Demand deposits (except interbank) ⁴	
United States (Dec. 1947).....	— 6.7
12th District (Dec. 1947).....	— 9.7

¹Adjusted for seasonal variation
²Measured from low point
³Weekly-reporting member banks
⁴All member banks

Business Activity Indices in Per Cent of 1935-1939 Average

(Taken as basis of 100)

	April	May	June
¹ Arizona	346.2	322.4	316.5p
² California	220.5	225.5	218.6p
³ So. California	265.4	268	263
⁴ Pacific N.W.	218.9p		
⁵ Puget Sound	209.8		
⁶ Inland Empire	205.5		
⁷ Lower Columbia	236.3p		

- Valley National Bank (Phoenix) index, based on a weighted composite of retail sales, agricultural income, and employment in mining, manufacturing and construction, and seasonally adjusted. 1949 = 100.
- Wells Fargo Bank & Union Trust Co., index based on the following components: industrial production, freight carloadings, bank debits, department store sales (weighted 4, 3, 2, 1, respectively, and adjusted seasonally).
- Security-First National Bank of Los Angeles index, based on the following components and weights, and adjusted seasonally: department store sales, 15; building permits, 5; Los Angeles bank debits, 20; residential city bank debits 5; agricultural city bank debits, 5; industrial employment, 20; industrial power sales, 13; railroad freight volume, 6; telephones in use, 7; real estate activity, 4.
- Index compiled by Bureau of Business Research, University of Washington. Basis of compilation not indicated. Preliminary estimate.

MANUFACTURING EMPLOYMENT

Estimated Number of Employees—Source: U. S. Bureau of Labor Statistics and State Agencies

	WASHINGTON		OREGON		CALIFORNIA		TOTAL PACIFIC	
	1948	1949	1948	1949	1948	1949	1948	1949
April	174,500	171,750	130,200	119,600	695,800	700,700	1,000,500	992,050
May	152,350	171,500*	133,600	127,700	696,500	696,800	982,450	996,000
June	164,200	174,250	144,600	130,900*	714,100	698,600	1,022,900	1,003,750

*Preliminary.

	MONTANA		IDAHO		WYOMING		COLORADO		NEW MEXICO		ARIZONA		UTAH		NEVADA		TOTAL MTN.	
	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949
April	17,000	17,500	17,800	17,500	5,900	5,900	.....	.....	9,000	9,400	15,900	15,500	23,307	26,200	3,400	3,100	.....	.....
May	.....	.....	19,500	18,600	6,100	6,000	.....	.....	9,400	9,850	16,200	15,500	25,219	26,000	3,400*	3,100	.....	.....
June	17,700	17,900	22,500	20,200	.....	.....	.....	.....	9,550	10,150	16,500	14,100	.....	.....	3,500	3,200	.....	.....

*Revised.

WHOLESALESALE'S SALES

In thousands of dollars. Percentage changes are from corresponding month of preceding year. From Bureau of the Census.

MOUNTAIN

	Automotive Supplies	Change	Electrical Goods	Change	Furn. and house furn.	Change	Groc. and foods exc. farm prod.	Change	General Hardware	Change
December	318	— 1	3,573	+ 10	300	—15	.....	.....	1,766	+ 6
January	575	— 3	2,492	—11	365	—10	.....	.....	1,326	+ 5
February	776	— 3	2,791	— 4	.....	.....	.....	.....	.....	.....
March	881	— 5	3,582	+ 1	.....	.....	.....	.....	.....	.....
April	762	—11	3,239	—15	.....	.....	.....	.....	1,914	—13
May	849	— 8	3,546	+ 1	236	— 4	.....	.....	.....	.....

	1,705	— 5	11,062	—12	566	— 2	4,384	.....	3,898	— 3
Dec.	2,061	—14	9,737	—10	1,188	—32	4,308	.....	4,774	—14
Jan.	1,383	—20	11,385	—11	271	—33	3,988	.....	5,172	—21
Feb.	2,315	—11	13,632	—19	.....	.....	9,163	.....	6,284	—16
March	2,320	—10	10,629	—20	214	—24	3,911	.....	6,974	—21
April	2,293	—11	11,705	— 5	267	—22	7,810	.....	6,284	—18

*Full-line wholesalers.

FREIGHT

Cars of revenue freight, railroad carriers in 11 Western states.

(Compiled from Assn. of Am. R.R. weekly reports)

	Carloadings		Received from Eastern Connections	
	1948	1949	1948	1949
January	515,433	423,684	272,131	242,340
February	593,982	526,425	327,746	328,279
March	455,468	451,267	269,437	264,223
April	508,140	489,843	271,524	259,297
May	656,333	631,651	350,966	348,190
June	593,121	566,042	303,680	280,650

*5-week period.

TRUCK TRAFFIC

(Number of commercial trucks entering state through border checking stations)

	—CALIFORNIA—		—ARIZONA—	
	1948	1949	1948	1949
January	12,666	12,510	.....	.....
February	11,924	11,863	.....	.....
March	13,380	14,377	19,511	22,336
April	13,776	14,755	18,133	22,129
May	14,741	15,681	19,059	21,182
June	14,816	15,365	19,312	21,504

BANK DEPOSITS

(In millions of dollars—adjusted)

Daily average month, all member banks in 12th Federal Res. Dist. Demand deposits excluding U. S. Gov't deposits, cash items in process of collection, and interbank deposits.

	1948	Net Demand Deposits	Time Deposits
January	8,959	6,086
February	8,218	6,031
March	8,760	6,124
April	8,421	6,110
May	8,366	6,109
June	8,322	6,136

BANK LOANS

Industrial, commercial and agricultural (In millions of dollars)

From weekly reporting member banks of Fed. Res. System in 7 western cities: L.A., S.F., Portland, Seattle, Tacoma, Spokane, and Salt Lake. (Average of Wednesday reports)

	1948	1949	1948	1949	1948	1949	1948	1949	1948	1949
January	2,265	2,191
February	2,191	2,148
March	2,099	2,033
April	2,033	2,003
May	2,003	2,003
June	2,003	2,003

CONSUMERS' PRICE INDEX

From Bureau of Labor Statistics 100 = 5 yr. Avg. 1935-39

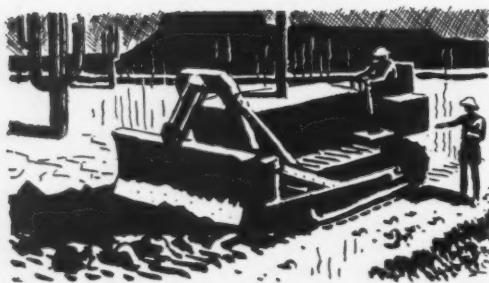
	Los Angeles	San Francisco	Portland	Seattle	Denver
Jan. 15	172.7	.....	178.8	.....	171.0
Feb. 15	171.3	.....	.....	174.3	.....
Mar. 15	171.0	174.6	.....	.....	.....
Apr. 15	171.2	.....	177.6	.....	169.9
May 15	169.6	.....	.....	172.5	.....
June 15	168.7	173.7	.....	.....	.....

	Industrial Supplies	Change	Lumber & bldg. mat.	Change	Mch. equip. and supplies excl. elec.	Change
Dec.	260	— 5	.....	.....	415	—29
Jan.	260	—20	.....	.....	.....	.....
Feb.	260	— 2	923	—37
Mar.	260	—10	1,085	—18	634	—30
Apr.	260	1,723	— 5	630	—24
May	260	—12	1,717	—14	782	— 8

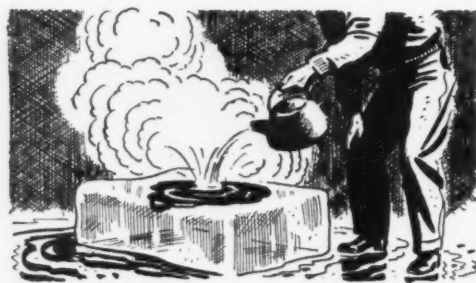
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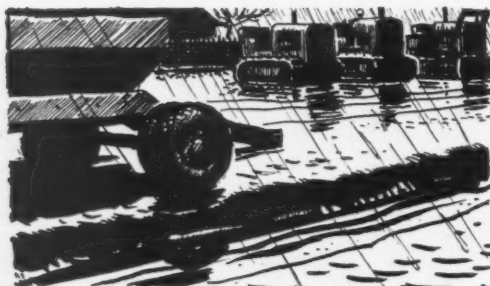
Does the Jobs of Many Greases



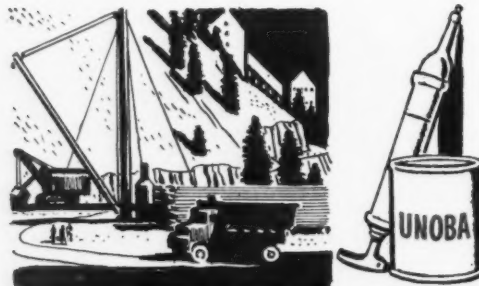
1. UNOBA simplifies your lubrication because it does the jobs that formerly required many different types, grades and brands of greases. UNOBA can do this because it resists *both* heat and water and can be used under almost all operating conditions.



2. You'll be amazed at the protection your equipment gets with UNOBA. Neither boiling water nor dry heat can cut its tenacious film. UNOBA maintains its smooth, buttery texture at temperatures from below freezing to 300° F.!



3. UNOBA gives the greatest possible defense against rust and corrosion. Because of its unusual adhesive quality and its heat and water resistance, UNOBA protects even idle equipment over long periods.



4. UNOBA reduces costs, saves you time! With UNOBA you need use only one gun and one container in most cases. Thus this multi-purpose grease holds stock inventory to a minimum, saves you time and cuts equipment costs.

For full information phone your local Union Oil Representative or write Sales Department, Union Oil Company, Los Angeles 14, California.

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NON-FERROUS FASTENERS** under the corrosive
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development in fastener manufacturing . . .
backed by the skill of four generations
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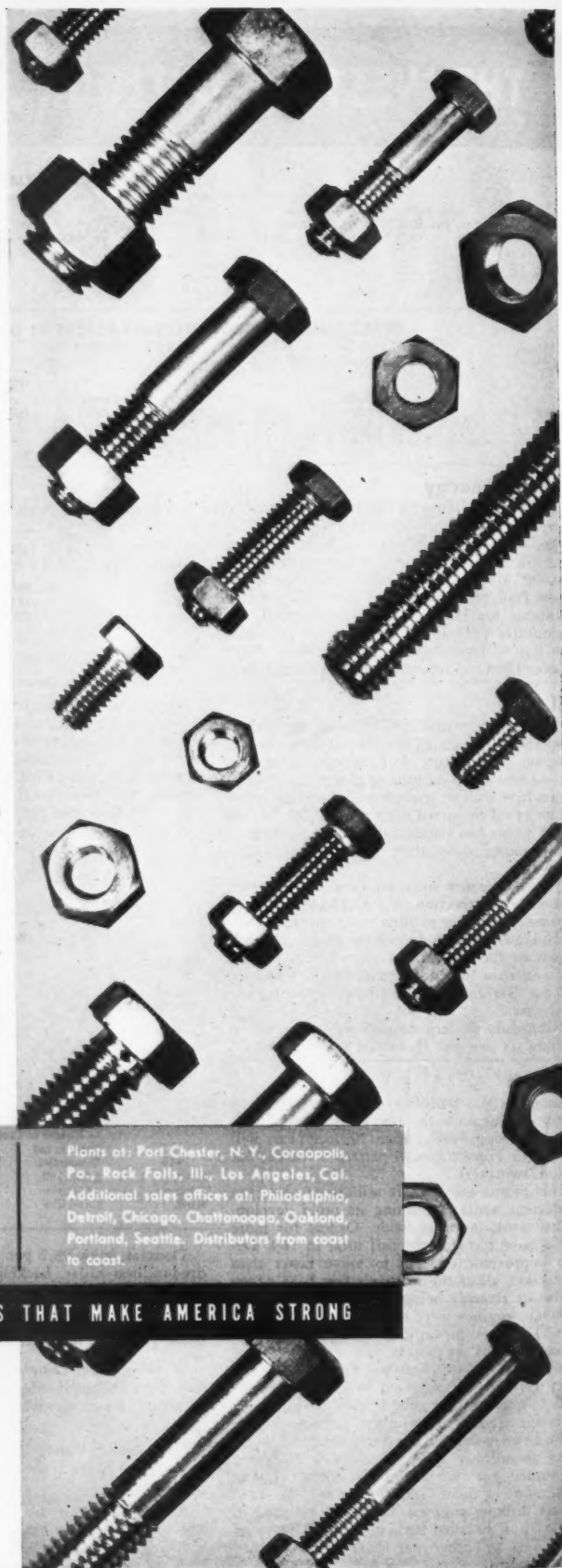
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Detroit, Chicago, Chattanooga, Oakland,
Portland, Seattle. Distributors from coast
to coast.



Steel

More cheerful tones are beginning to be heard from steel mills as the result of some pick-up

IRON AND STEEL

Western Area of the United States
From American Iron and Steel Institute (in net tons)

	Pigiron Output	Percent Capacity	Steel Output	Percent Capacity
January	232,437	93.9	436,216	97.6
February	209,082	93.6	402,533	99.7
March	235,176	95.0	451,926	101.1
April	216,434	90.3	414,794	95.8
May	194,525	78.6	405,170	90.6
June	170,516	71.2	351,917	81.3

Nonferrous Metals

Nonferrous metal production was down during July but not so much as mine closings and curtailments would indicate. Generally the operations which have closed because of price declines are small ones which account for only a small percentage of total production.

Phelps Dodge Corporation announced recently that all of its plants in Arizona are now working an 11-days-on and three-days-off schedule, a slight curtailment from the work arrangement that was in effect for many months.

A forecast of future copper producing conditions made by James Douglas, secretary of Phelps Dodge Corporation, puts the average domestic refined copper consumption (including secondary copper treated at primary plants) from 1919 to 1940 at 11.7 pounds capita.

NONFERROUS METALS

(Production in short tons, From U. S. Bureau of Mines)

	ARIZONA	UTAH	MONTANA	NEW MEXICO	NEVADA	WEST'N STATES
Copper	32,450	18,320	5,030	5,221	3,460	65,317
Lead	2,640	5,190	1,530	727	910	22,926
Zinc	5,560	3,980	4,970	4,028	1,990	32,385

Lumber

Mill stocks at West Coast Douglas fir sawmills dropped about 80,000,000 feet in June below May record postwar totals of 1,011,833,000 board feet, according to Harris E. Smith, secretary of the West Coast Lumbermen's Association. Douglas fir lumber production for the first six months of 1949 is 423 million feet below 1948 output and 189 million feet below 1947 cut.

California Redwood Association reports that total redwood production in 1948 probably was in the neighborhood of 641,000,000 feet, although information to make a close estimate are insufficient.

Pulp and Paper

Price of bleached sulphite pulp was cut \$7 for third quarter, with comparable reductions for other grades. Mills will be able to absorb with no great difficulty. Newsprint mills are running all right; wrapping papers are slower as larger buyers absorb over-large inventories. Pulp mill operations are about on same level as month ago, but with prospects of resuming before long. Pulpwood logging is down in proportion. Mills still cutting back inventories of expendable supplies, but some change anticipated as fourth quarter requirements are shaped up.

PULPWOOD

(Pacific Northwest)
(Cords of 128 cu. ft., roughwood basis,
Source: Bureau of Census)

	Receipts	Consumption
March	207,096	299,282
April	286,232	280,503
May	316,352	255,563

in demand. Trade in galvanized sheets is brisk, with shortages in light gauges, pipe demand good and a decent volume in plates. The scrap market also has improved somewhat.

ALLOY STEEL

(In thousands of bbls.; from U. S. Bureau of Mines)

	Output	Carbon Inputs, Hot Topped*
January	7,706	9,096
February	5,945	13,769
March	8,127	13,898
April	5,068	12,999
May	4,423	9,690
June	4,990	7,051

* Included in total steel.

With an estimated present population for the United States of 149,000,000 he figures an indicated normal consumption of 73,000 tons per month, a drop of 35 per cent from the average level of consumption in 1947 and 1948, the two postwar years when a pent-up demand was being satisfied. Domestic mine production has been at the rate of 75,000 tons a month, but foreign production has increased 10 per cent since the prewar period, while foreign consumption has decreased 45 per cent, creating an excess of foreign copper which in recent months has averaged 35,000 tons a month. Without tariff protection, Douglas believes domestic copper mining will have to be curtailed about 45 per cent, but with restoration of the copper tariff, which was suspended in April 1947 for a period of two years in order to take care of the shortage in domestic supply, the curtailment would be much less.

LUMBER

(In thousands of board feet)

From West Coast Lumbermen's Association (Douglas Fir, Sitka Spruce, Port Orford Cedar, West Coast Hemlock, Western Red Cedar):

Year through	1947	1948	1949
June Production	4,269,584	4,444,121	4,080,247

From Western Pine Association figures (Idaho White Pine, Ponderosa, Sugar Pine and associated species):

Year through	1948	1949
June Production	1,132,951	1,032,991

From California Redwood Ass'n figures (includes redwoods and whitewoods):

Year through June	1949
Production	210,960

Cement

Business in California is estimated to be about 15 to 20 per cent below last year, but the mills have been running at capacity and piling up inventory. In the Pacific Northwest conditions are reported good. A drivers' strike in the San Jose-San Francisco area began early in August, affecting ready-mix concrete operations, which if long continued would have serious effects.

CEMENT

(In thousands of bbls.; from U. S. Bureau of Mines)

	—California—	Oregon - Wash.	Utah - Idaho
	1948	1948	1948
Jan.	1,936	1,653	422
Feb.	1,824	1,593	414
March	2,013	1,828	515
April	2,140	2,066	579
May	2,019	2,042	559
June	2,022	2,066	586

Aluminum

Consumers sales in the building and appliance lines are reported to have picked up, but in the utensil line to have continued down. This has resulted in but little change in the sales picture for the mills, however, because most consumers have been carrying heavy inventories. Reports of a swing back to steel from aluminum are believed by the aluminum people to be premature. In the roofing field, for example, galvanized iron only came into adequate supply in June.

Plywood

Heavy additions to industry's production capacity caused by new plants entering the field within the past couple years have not been absorbed by the market. Plywood has changed from scarce item to something more resembling a drug on the market. Pressure selling is evident and takes on some new forms resembling the huckstering of poor fruit by fly-by-nights at the roadside. Production is off and new moves are cautious. Continuation of present price structure may bring awkward difficulties for some plants caught with heavy commitments for high priced timber. Big new industry-wide promotion is under way but it is too early to know what improvement this will bring.

SOFT PLYWOOD

From Bureau of the Census
PRODUCTION
(In thousands of square feet)

	1948	1949
March	185,716	175,714
April	164,862	152,738
May	151,364	154,677

STRUCTURAL CLAY PRODUCTS

	UNGLAZED BRICK (in thousands of standard brick)	UNGLAZED STRUCTURAL TILE (short tons)	VITRIFIED CLAY SEWER PIPE (short tons)
	Mountain	Pacific	Mountain
December	10,854	19,003	3,311
January	8,864	12,192	2,200
February	7,877	11,163	1,562
March	10,145	11,576	1,557
April	8,276	16,237	2,519
May	11,997	20,864	2,894

Apparel

The long-awaited break in woolen fabric prices came when American Woolen Company world's largest manufacturer of woollens and worsteds, made the biggest cut in men's suitings in nearly 30 years. Cuts run up to about 19 per cent, with reductions from 27 to 37 cents per yard on women's wear worsted fabrics. The company said it hopes to stimulate buying and keep its mills running by early announcement of its prices. Effect will be felt on clothing for next spring.

Expectation of such a readjustment has helped keep many manufacturers buying on a hand-to-mouth basis. World wool prices have been very high, yet U.S. production has been almost as low as it was shortly after the Civil War. Meat has been more profitable to raise. When slower fabric sales recently caused importers to cut their purchases in world markets, prices dropped about 10 per cent, paving the way for the present cut on wool fabrics. The market for woollens had nearly reached the stage of a buyer's strike, with declining retail sales and growing unemployment reinforcing the hand of the buyers.

Since inventories have been allowed to reach a fairly low point, trade expectation is that brisk buying will be resumed, leveling out production at a comfortable figure.

Employment in western apparel is beginning to climb seasonally. Prices are running about 10 per cent to 25 per cent lower than last year. Sweeping cuts on men's shirts and other long

(Continued on Page 31)

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In the treating of both ferrous and non-ferrous metals, Gladding, McBean & Co. refractories have distinct advantages:

 silica and clay brick are made by power-press, stiff-mud and hand-mold methods under rigid technical control to insure uniformity of size, ease of handling and economy of mortar.

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 wide variety of standard and special shapes and sizes insures prompt delivery, faster installation. And our full line of plastics, coatings, mortars and castables bring you complete, quality refractories service.



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(Continued from Page 29)

overpriced items have led many buyers to feel prices have overtaken reduced consumer buying power. Outlook is fairly promising for the near future, they believe.

California Apparel Creators have just featured what they term the first "all-California" cotton grown, forecasting western production of fabrics utilizing a brand-new strain of white fiber. Known as "Acala 4-42," the new type of cotton was developed in five years of selective breeding at a Government experiment station to achieve a quality fiber of higher tensile strength and better spinning properties. Mills already are offering premiums over other cottons.

Furniture

Retail furniture dealers in California, Oregon, and Nevada and furniture manufacturers in Southern California are the joint beneficiaries of a recent decision regarding stop-in-transit shipments handed down by the Pacific Freight Tariff Bureau.

Through the efforts of the Furniture Manufacturers Association of Los Angeles, represented at the hearing by General Traffic Manager F. F. Morgan, dealers in these Western states receiving furniture from Los Angeles will continue to receive the benefit of carload rates when cars are stopped in transit for partial unloading before reaching final destination. This decision will result in preventing an increase in furniture shipping rates amounting to 30 to 60 per cent over and above the existing rates.

This is still not as good a deal as Eastern and Middle-Western manufacturers shipping to the Pacific Coast get. They are entitled to three stops in transit, while the southern California manufacturers are allowed only one stop.

Chemicals

Believe it or not, here is one thing of which there was a shortage this year, namely, insecticides. Manufacturers of DDT and BHC (benzene hexachloride) were taken by surprise and found the demand far out ran their supply. Toxaphene and chlordane were also short in some areas. Recent reductions in paint prices were due in part to price declines in some paint materials that the paint manufacturers passed on to consumers.

ETHYL ALCOHOL

(From Bureau of Internal Revenue)

Production (in proof gallons)

DOMESTIC UNDENATURED ALCOHOL				
1949	California	Colorado	Washington	
January	559,736	.....	481,307	
February	219,204	.....	401,952	
March	378,555	.....	448,298	
April	558,733	.....	321,203	
May	379,931	.....	269,087	
June	668,503	.....	244,170	
DENATURED ALCOHOL				
1949	California	Utah	Washington	
January	42,898	.....	24,697	
February	19,740	.....	8,203	
March	20,905	.....	8,186	
April	38,306	.....	16,329	
May	15,430	.....	8,188	
June	30,608	.....	16,301	

CALIFORNIA COTTONSEED

(In tons of 2,000 lbs.)

	Receipts at Mills	Crushed or Used
March	6,994	41,759
April	.....	30,558
May	1,497	28,328

CALIFORNIA COTTONSEED PRODUCTS

	Crude Oil (1,000 lbs.)	Cake & Meal (tons)	Hulls (tons)	Linters (Running bales)
February	11,917	17,044	6,817	12,254
March	14,182	19,532	9,219	14,053
April	10,521	14,860	4,998	10,856
May	9,361	13,868	5,936	8,698

Canning and Packing

Apparent collapse this season of the fresh shipping market for California fruits, such as Bartlett pears, apricots, freestone peaches, and grapes is attracting more attention than the low prices being paid by canners for their fruit this year. Northwest apples had a difficult time last year, and this season does not look better. Whether it is freight rates or decreased buying power in the East is not yet apparent.

Lower prices on canned goods are coming out, due partly to the low orchard prices. Pears, for which canners paid \$120 ton last year, have dropped to \$20, apricots sold for around \$40 to \$65, and cling peaches will be \$40, as against \$65 last year.

Apricot pack was probably in the neighborhood of 2,750,000 cases, compared with 4,650,000 in 1948. Low prices paid by canners did not drive a large tonnage to the dry yards, because dried fruit packers have selling problems of their own.

A control plan by agreement between processors and growers is in effect this season on cling peaches which will bring the total tonnage to be accepted by the canners down to 400,000 tons (total crop 595,000 tons). The minimum diameter of fruit has been increased to 2 3/8 inches to 62 millimeters (2.441 inches) and rejection of all culls is required. As a result, it is expected that most of the pack will go into the fancy and choice grades, which are always the easiest to sell, while the standards, pie and water grades which usually are the drug on the

Sugar

The Hawaiian Islands are overflowing with raw sugar as the dock strike in the territory continues to back up the output of the mills there. C&H have been depending on Philippine, Cuban, and Porto Rican sugar to keep their big refinery at Crockett, California, in operation, with the result that uncertainties in delivery have resulted in limited production and occasional shut-downs.

Sugar content in California beets is reported much better than last year, when weather conditions were unfavorable in the growing season. Prospects for beet sugar acreage in California in 1950 are considerably better than for 1949, as

Flour

Millers are looking for some improvement in government purchases as a result of the new international wheat agreement, which provides an export subsidy of 34 cents a bushel on wheat and flour shipments to nations in the wheat agreement. Grinds in Pacific Coast Mills have

market, will be sharply reduced in volume. This may put cling peaches in a strong position.

On the above volume of cling peaches, a fruit cocktail pack of 7,500,000 cases would ordinarily be expected, but the longshore strike in Hawaii has stopped all imports to the mainland of pineapple, one of the ingredients of fruit cocktail. However, the low price of pears may induce packing of cocktail, using Mexican or Cuban pineapple, which is much inferior to Hawaiian pineapple.

A winter frozen vegetable pack of 44,050,141 pounds for the spring of 1949 is reported by the Western Frozen Food Processors Association, compared with 23,102,350 pounds a year ago. Spinach was the big item, 17,697,845 pounds, broccoli next at 15,829,118 pounds, followed by cauliflower, 6,404,950 pounds, and Brussels sprouts, 4,118,228 pounds.

Bristol Bay area in Alaska, the big red salmon district, ended season late July with pack about 560,000 cases compared to 1,286,000 in 1948. Southeast Alaska, with very short season to rehabilitate the run, will fall far short. Pinks and chums, which run only in odd numbered years, being given greater escapement to build for future. Puget Sound packers lost a week to strike by union fishermen over raw fish prices and most sockeyes swam past American waters to Fraser River where Canadians may still get. Columbia River lost fish by strike trouble, too. Overall pack prospects for salmon reflected in government "comparable week" estimates accumulative to mid-July: 904,000 cases for 1949; 1,585,000 for 1948; 2,018,000 for 1947.

the result of prospective cotton quotas and limitation of acreage. In the Salinas Valley a poor lettuce year indicates a swing to beets in 1950.

Beet harvests in the West this year will be lower than last, according to the July 1 crop estimate of the Department of Agriculture, which indicate tonnage as follows:

	1948	1949
California	2,819,000	2,431,000
Utah	427,000	405,000
Colorado	1,770,000	1,760,000
Idaho	1,233,000	940,000
Nebraska	406,000	518,000
Montana	672,000	708,000
Wyoming	310,000	350,000
Total U. S.	9,422,000	9,585,000

WHEAT FLOUR

(In thousands of sacks. From Bureau of the Census)

	Ore.-Wash.	Montana	Utah	Colorado	California	Total
December	1,554	285	318	445	372	2,974
January	1,539	269	313	439	375	2,935
February	1,388	236	269	366	353	2,612
March	1,269	277	329	426	372	.....
April	971	264	259	363	261	2,118
May	1,159	278	281	307	313	2,338

CONFECTIONERY AND COMPETITIVE CHOCOLATE PRODUCTS

(From Bureau of Census)

(In thousands of dollars)

	COLO. - IDAHO - UTAH	Per Cent Change from same month of Preceding Year	WASH. - OREGON -	Per Cent Change of Preceding Year from same month	CALIFORNIA -	Per Cent Change of Preceding Year from same month
October	808	+ 3	466	-24	2,929	+ 3
November	980	- 7	580	-11	3,253	+15
December	901	- 3	453	-13	2,669	- 7
January	577	- 9	397	-18	2,333	- 6
February	490	+ 3	296	+ 8	2,122	- 2
March	589	+ 1	412	+17	2,504	+ 5



Whither Gold, Thither Steel

Out of the West a hundred years ago came an irresistible call to California. And the growth of California, unspectacular before, suddenly became headlong. For there was gold in California, and gold was the god of the age.

Hard on the heels of the gold-rushing Forty-Niners came industry—industry that was to sustain the pace of California's business progress long after the lure of gold ceased to be California's main attraction. And the basic

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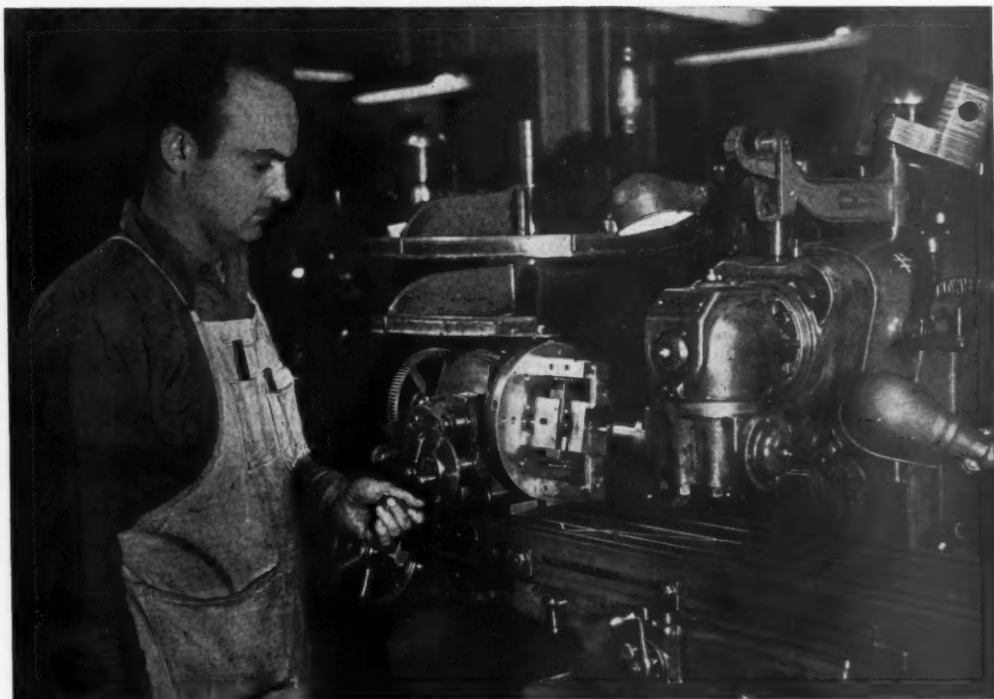
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THE INDUSTRIALIZED WEST



A METALS ISSUE . . . This issue of *Western Industry* is devoted to the metal working field, in which the West is largely young, compared with the older industrial centers of the East and Middle West, but with some outstanding exceptions in accomplishment. Shown here is a Brown and Sharpe Universal Miller threading cavity for die cast mold at Cannon Electric Co., Los Angeles, on an electric connector job.

What's Ahead in the Western Metal Working Industries

IN presenting this Metals Number of *Western Industry* to our readers, it is logical to give our readers first of all some indication of the trends and developments that lie ahead in the metals working field in the West.

Consequently we have called upon the newly-elected chairmen of various Western chapters of the American Society for Metals to do a bit of forecasting, and their ideas are presented in brief manner in the next four pages, as an introduction to the educational articles that go to make up the main text of this issue.

It is notable that they stress the need for greater technical knowledge. Considering its youth as an industrial area, the West does not need to apologize for its shortcomings along this line. Nevertheless, the fact remains that the West has a big job ahead of it, which must be done in a short time if the West is to fulfill its destiny as the coming industrial area of the country.

By "coming industrial area," we do not mean just the ordinary iron and steel, copper and brass, industrial economy of the older parts of the country, but a new phase of industrial development motivated by the discoveries coming to light daily in aeronautics, jet propulsion and the still-nebulous but inevitable atomic energy. With the Pacific Coast the center of aircraft production, and the big atomic scientific centers of Hanford, Los Alamos, Sandia and Arco located in the West, the time obviously has come for broad foundations of technological education to be laid in our big Western universities.

With the Pacific Coast the center of aircraft production, why should the aircraft manufacturers, for instance, have to go East (except for the small number Caltech can turn out) to find engineering talent to staff their plants? Why not schools of aircraft engineering right here at home?

QUESTIONS:

In order to crystallize the line of thought in the West regarding the trends in its metal working industries, this symposium is presented as an introductory feature to the Metals Number of *Western Industry*. Here are the questions which we felt should be answered:

1. What trends in fabrication of metal products do you see developing in the West?
2. What new uses for metals do you foresee?
3. What metals seem to show the greatest promise of future development?
4. What new types of metals are industry most likely to demand?
5. Along what lines do Western fabricators most need to be educated?

ANSWERS:

Brief replies from Western chapter chairmen of the American Society for Metals are given on the following three pages.

Technological Gap Too Wide

By ARTHUR S. COFFINBERRY

Group Leader for the Physical Metallurgy of Plutonium, Los Alamos Scientific Laboratory, University of California, Los Alamos, N.M.; Chairman, Los Alamos Chapter, American Society for Metals.

THE West, which has for many years lagged seriously behind the East in application of new fabrication techniques, must narrow this technological gap. Incentives for modernization have been provided by the enormous increase in Western population and consumer market, and the development of sources of primary raw materials.

A natural outgrowth of the juxtaposition of raw materials and markets will be a trend toward integrated production and industrial diversifications. With integrated production comes increased responsibility for costs and quality. Die, permanent mold, and investment casting methods are likely to be used to a greater extent in the future. Large mass-

produced stampings and drawings, where the shipping-cost to final-cost ratio is high, may well be produced in the West near the region of consumption.

Die making, heat treating, and finishing facilities will find necessary the use of latest advancements and innovations in these respective fields and may require considerable capital for expansion. Such diversification and expansion will require large amounts of capital and trained personnel. These should, preferably, come from the West.

There will probably be very few new uses for metals in the near future which have not already been tried and publicized. However, with the present day trend toward intelligent engineering of products, we may expect an intensification of the "tailoring" of metals and alloys for a particular job. This will lend impetus to the present tendency to abandon outmoded concepts of strength-weight relationships and to substitute freely one metal for another.

Within the not too distant future we may expect to see zirconium and zirconium alloys take an important position in the chemical and allied industries in order to take advantage of their superior corrosion resistant properties. Titanium and its alloys will find many applications where high strength-weight ratios are desired in conjunction with good corrosion and heat resistance. The use of the light and ultra-light metals and alloys should increase steadily, and we may expect intensive development in this field to continue.

Alloys with good forming characteristics which are suitable for use at very high temperatures, and others for use at low temperatures, are certain to be in demand. In the field of consumer goods those alloys capable of decreasing weight without sacrifice of strength will probably become increasingly popular. When mass production techniques are more extensively adopted in the West one may predict that free-machining alloys and deep-drawing alloys will assume greater importance.

Western fabricators, as a group, are lacking in appreciation of the almost inestimable values to be derived from research and from technically trained employees. Western industry must learn that adaptations of results of researches conducted elsewhere are usually not equal in value to "on-the-spot" investigations carried out by competent personnel. Such personnel can be obtained in two ways: by securing a staff with the proper background of experience, or by operation of a well-planned training program. The latter excellent practice has not yet been adopted by a significant portion of Western industry. Participation in the progress of regional or cooperative research laboratories may be profitable for those industries which are too small to support their own laboratories.

In summary, Western fabricators need to be educated, not so much in technological detail, but rather in the techniques of fully utilizing the abilities of scientific personnel.



ARTHUR S. COFFINBERRY



IRVING LEHENY



DON ROSENBLATT

Carbides In Die Field

By IRVING LEHENY

District Manager, Allegheny Ludlum Steel Corporation, San Francisco; Chairman, Golden Gate Chapter, American Society for Metals

The writer is not closely connected with the casting or plating industry. However it would seem that many parts are now being fabricated by forming, blanking and welding operations that heretofore were deemed impossible or uneconomical to manufacture by these methods.

We have seen the use of carbide metals entering the die field, whereas this material was confined primarily to the use of single and multiple point cutting tools. Long life production dies are being made from this material, as well as wear parts, etc. It is quite possible the use of this material for such parts as stated above could far exceed the amounts used in machining operations.

Super alloys and new material alloyed electrical steels are being developed and improved by the research departments of firms manufacturing this class of material.

As we in Northern California do not have much large volume production as is known by such industries as the automotive, airplane, etc., to the best of the writer's knowledge the requests that might originate from the average plant in this area can be quite well filled by available materials that are well established in the industry as a whole.

Most of the operations involving fabrication of metals are fairly well known

to the fabricators. Therefore the only education men in their representative fields would need would be to keep abreast of the developments made of the new metals now available, such as magnesium, stainless steels, etc. Generally speaking, these new metals are fabricated on the same basic principles as applied to metals whose characteristics are well known. Mainly the difference and behavior of the metals need be compensated for in the speed of the press or the feed of the tool.

Receptive To New Processes

By DON ROSENBLATT

Chief Metallurgist, American Foundry & Machine Co.
Chairman, Salt Lake City Chapter, American Society for Metals

Trends in fabrication are towards the application in manufacture of modernized machinery and processes. Metal products producers are fast arriving at a point of mechanization comparable to that adapted during the war by larger eastern firms. Such processes as automatic submerged arc welding, design features employing higher tensile raw materials to effect reduction in weight, the application of continuous heat treating and inspection equipment are finding increasing favor with the intermountain fabricators.

The rapid growth of oil fields and refineries in this area has given impetus to the research and development of suitable new metal alloy products for this field of application while new uses of metal products for the well established mining industry continue to be explored. The advent in the near future of a sizeable copper refinery in this territory will no doubt attract manufacturers consuming raw copper to the West, much as has the location of our large steel mill brought in eastern fabricators.

The ferrous metal producers in this area are apace with their eastern counterparts in showing great concern over the development and production of "nodular graphite" or "ductile" cast iron, a new metal alloy the potentialities of which are enormous by comparison with any new alloy developed in recent years.

The mining industry does not relent in its search for more abrasion resistant metals for use in mining and process machinery. High pressure and high temperature alloys are also likely to be in increased demand due to the trend



JAMES B. MOREY

of the chemical industry towards higher temperatures and pressures.

Steel mill and other metal producer chief technical personnel are disturbed by Western fabricators' lack of education in this regard:

(a) fabricators are not taking advantage of the technical service offered by the mill in aiding the manufacturer in planning and selection of suitable material to meet end use prior to contracting for large quantities of material which may be rejected because it wasn't prudently chosen.

(b) fabricators which do not cooperate with the mill in the above regard are often without competent staff of their own to perform necessary technical service in lieu thereof.

Myriad Uses For Alloys

By JAMES B. MOREY

International Nickel Company, Los Angeles
Chairman, Los Angeles Chapter,
American Society of Metals

It would appear that all the types of fabrication of metal will tend to grow throughout the West. Castings and stamped products should definitely tend to increase in popularity as new lines are manufactured here, in the Bay area and in the Northwest. Heat treatment of such products, and in specific cases, will also grow apace.

As for electro-plating, there seems to be a strong surge of new interest in this field. Especially does hard nickel plating, bright nickel and chromium plating, and a technique known as "Electro-

forming" interest many designers and engineers in a miscellany of fields.

In specific instances in the chemical field, it has been noted that whereas wood, plastics and other materials tried out during times when metal supplies were limited—some of these will be displaced by suitable alloy metals. Since corrosion influences crop out almost invariably throughout all industry, the uses for suitably high resistant metals and alloys are myriad—and growing daily.

One new metal, or what might be considered the adaptation of an old one to new fields, is Ductile Cast Iron. This is gray cast iron so treated with magnesium or Mg-alloys, that its properties are greatly altered—and favorably, for industry. Thus, fields where gray iron would fit admirably, but where it did not have sufficient strength or ductility (lack of brittleness), are now susceptible for opening up to this new product.

Without mention of the fast-growing types of metals designated as stainless steels, our list would certainly be incomplete. The use of stainless steels, especially the more highly corrosion-resistant chromium-nickel group, is advancing rapidly in all fields of industry. At the moment there appears to be no foreseeable limit nor saturation point.

The considerable research going on in this area relative to jet propulsion and gas turbines, etc. is calling for great effort in the application of highly alloyed metals for resisting great heat effects. Therefore, there certainly is indicated a rapid growth in the use of these materials for a long period to come. The same statement applies as well to those metals adaptable to extremely low temperatures extant in equipment for storing components of

rocket and jet propulsion fuels. Certain petroleum refining practices involve the increasing use of quantities of alloys for sub-zero temperature service.

Industry is always seeking new metals with properties not readily attainable with present products. An example of this would be metals required to resist both corrosive and abrasive influences. Certain types of nickel alloyed cast irons are being developed at this time to handle just such requirements. Heat-treatable stainless steels of the 18-8 chromium-nickel types are further examples.

Since only metallurgists can keep abreast at all—and that is difficult—of new metals and alloys, as well as new applications for the same, fabricators should seek assistance of and consultation with those Companies and men best equipped to help them in their problems. Improper use and treatment of excellent alloys may mean failures in service, not truly attributable to the metals themselves. Such results hurt all industry and should be avoided at all costs.

Combinations With Ceramics

By JOHN F. CRANE

Chief Engineer, Rocheville Engineering, Inc.
Chairman, San Diego Chapter
American Society for Metals

The greatest discovery in metal fabrication that I know of in the West was just recently announced at one of our society meetings. This process deals with high temperature alloy deep drawing or compound curve forming with the sub-zero treatment. Stainless steels formed at subzero temperatures have shown greatly increased ductility and from 75% to 100% increase in tensile strength over present day values. Dry ice is used to precool the dies and fabricating metal with excellent results.

New uses for metals in combination with ceramics shows the greatest promise for high temperature work and development. Metals in combination with a new graphite process called "Electrofilm" possess great wear resistance, corrosion and erosion resistance and increase surface wear. Fuel and oil lines or office walls may be coated with this film and dialled to any desired temperature with electrical current. Ships at sea may also have their metal bottoms coated, thus establishing a protective film.

The finest high temperature alloy metal has proven to be alloy 31, which after 24 hours in a carburizing furnace does not show any carbon increase in the microstructure. Continuous operation at 1500 degrees F. is an approved function for this alloy. As soon as po-



A. C. WOOLLEY

litical pressure is lifted from the jet engine picture, Alloy 31 and others like it will allow our jet engine liners to last 1000 to 10,000 hours instead of the present 25 to 125 hours of life.

Industry will demand more and more high temperature alloys as our transportation demands for higher speeds increase.

Western fabricators need to know more about processing, which includes the water problem, care of personnel which means more job security, high temperature alloys, and corrosion of metals and economical protective film treatments such as Electrofilm.

Wider Use Of Light Metals

By A. C. WOOLLEY

Woolley Instrument Service, Inc., Portland.
Chairman, Oregon Chapter, American
Society for Metals

The most noticeable trend is the beginning development and uses of both aluminum and magnesium in the transportation field, particularly in the logging industry.

An increase in the production and use of aluminum sand and die castings and heat resistant alloy. In the field of heat treatment a wide use of induction heating and controlled atmospheres is noted.

Magnesium castings are now being fabricated and used by the logging industry as wedges, hooks, log truck bolsters, etc. The use of aluminum as shingles is one of the newer applications of this metal.

There is an increased demand for heat resistant castings in this region.



JOHN F. CRANE

There is a further demand for light weight, high strength alloys, sheet and formed materials for structural uses. This would indicate a decided swing away from the customary structural materials.

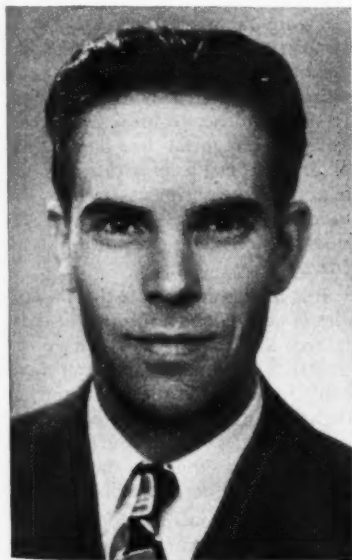
Future development showing greatest promise is in the non ferrous and high alloy stainless steel fields.

Western fabricators most need education along the lines of refinement in production and inspection methods to assure better quality. These refinements will be required to meet tougher specifications as well as reduce costs to meet competitive prices.

Forgings Need More Strength

By RICHARD W. HARGIS
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Chairman, Puget Sound Chapter
American Society of Metals

I have noticed since World War II the necessity for forgings having higher strength and longer life before failure



RICHARD W. HARGIS

due to fatigue. The present requirements of modern lumbering is a good example. The increasing failures experienced on critical parts is caused by the demand of the operators for heavier feeds and higher speeds.

The supplier is required to give more attention to his selection of the proper steel to fit each case and how it should be heat treated to obtain maximum strength with greatest ductility obtainable. Care must be taken to eliminate all stress risers caused by poor machining and design. The method of hogging out bar stock to suit is fast disappearing, even though it is simpler and cheaper.

Too many suppliers are failing to recognize the danger involved in losing good business when some vital part which they had furnished fails. This could be avoided by the proper working of the steel, such as forging and heat treating.

Although not entirely new, more applications are requiring higher alloyed steels than the standard AISI series. Shafting as large as 24 inch diameter requiring physicals of 100,000 to 120,000 lbs. per sq. inch Y.P. are not too uncommon. On the other hand some users have been able to redesign their equipment to use only mild steel shafting and forgings benefiting by cheaper replacement cost.

I believe that industry will be using sulphurized alloy steels in larger amounts in the near future. Modern steel making is producing sulphurized alloy steel having good machinability and yet little or no loss in strength.

The greatest need of industry in general is a better understanding by the designing engineers of the fundamentals of steel selection and subsequent heat treatment. The supplier with a knowledge of such fundamentals is in an ideal position to help his customers as well as his business. This situation seems to be more pronounced in the Pacific Northwest.



JOHN M. MARCHI

More Metal In Building

By JOHN M. MARCHI
Trentwood Rolling Mill, Spokane, Wash.
Chairman, Inland Empire Chapter,
American Society for Metals

I believe that metals will see many increased uses mainly in the building industry. We have noticed a very definite trend toward the use of aluminum in window frames, siding, roofing, and rain troughs.

Aluminum seems to show the greatest promise of future development in the Northwest. The purchase of the Trentwood and Mead plants in Spokane by the Permanente Metals Corporation assures the Northwest of becoming the light metals center of the country.

The present trend in industry seems to show a definite need for high strength metals which will withstand high temperatures. In the near future, when atomic power is more developed, this need will be even more pressing.

ELEVEN WESTERN STATES PRODUCTION OF PRINCIPAL METALS

(Compiled from U. S. Bureau of Mines figures. All figures are for 1948 except manganese and mercury, for which only 1947 figures are available.)

Iron Ore	5,018,000 ¹ short tons	Molybdenum	13,353 short tons
Copper	315,990 " "	Antimony	6,034 ⁴ " "
Zinc	193,650 " "	Tungsten	3,259 " "
Lead	180,150 " "	Mercury	23,117 76-lb. flasks
Manganese	74,072 ² " "	Gold	1,387,458 ounces
	17,674 ³ " "	Silver	5,837,691,578 " "

¹Does not include approximately 86,040 tons of ore containing natural 5 to 35 per cent manganese produced in New Mexico and 9,560 tons produced in Montana.

²Manganese content from ore containing 35 per cent or more natural manganese.

³Manganese content from ferruginous manganese ore containing 10 to 35 per cent natural manganese.

⁴Approximate.

Foundries Find Fertile Field In Nodular Iron Castings

AT LAST the goal long dreamed of by foundrymen and metallurgists has been reached—that is, iron that is ductile “as cast.”

This revolutionary development was first announced by H. Morrogh, of the British Cast Iron Research Association, at the meeting of the American Foundrymen's Association in May 1948. Morrogh's paper, published in *The American Foundryman* April 1948, reports on the new metal in great detail.

Briefly Morrogh obtained cast iron with about 5,000 psi tensile strength, 238 Brinell Hardness, 0.60 in. deflection, with 90 ft. lbs. impact. (Brit. Std. Spec. 1349-1947.) He used a rather special mixture of hypereutectic composition, containing high silicon and carbon, with very low sulphur and phosphorus.

By adding about .30 percent Cerium to such a base metal, Morrogh obtained most of the graphitic carbon in rounded or nodular forms, which accounted for the high physical properties and resistance to shock. A typical base metal was: Total carbon 3.98 percent; Silicon 3.19 percent; Manganese .78 percent; Sulphur .028 percent; Phosphorus .04 percent.

Great credit is due Morrogh and his associates, who worked for some years on this problem, and finally solved it. (Patents have been applied for.) The main disadvantage of the Morrogh process is the necessity for having very low sulphur and phosphorus, and the high cost of Cerium is a detriment.

Morrogh's new iron, and others subsequently announced, will have a far-reaching effect. First, it furnishes the engineer with an entirely new cast metal, very strong, machineable, resistant to shock, and moderately ductile. Second, it has opened up an entirely new field for the metallurgist, at first

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Consulting Metallurgist
Los Angeles

in producing the new metal, and then reaching out into better and better modifications of the process. Third, it offers present, or prospective foundries a field which has enormous possibilities.

A pertinent question is, “Why does a slight change in the shape of graphitic carbon effect such a great improvement in the physical properties of the castings?”

A glance at the microstructure will answer this question, bearing in mind that *the microstructure of a metal determines its physical properties and serviceability.*

Figure 1 shows the long thin flakes of graphitic carbon in an ordinary grade of gray cast iron, magnified 100 times. Graphite has little strength, and forms planes of weakness. When gray cast

iron is subject to violent shocks, the flakes of graphite furnish millions of small “notch effects” and fractures run from flake to flake. (Incidentally, the graphitic carbon in cast iron can be produced as desired in different shapes and sizes, and has many useful properties.)

Figure 2 shows the rounded or nodular forms of carbon in nodular iron castings, at 100 magnification. It is obvious that the small nodules will have far less tendency to break up the continuity of the metal than do the flakes of graphite in the gray cast iron, and that therefore incipient fractures will have much more space to “jump.” Besides this, there is very little “notch effect.”

It is interesting to note that the nodules of carbon which form in the nodular iron as it cools in the mold are very similar to the nodules of “temper carbon” formed in malleable castings in the annealing process, and that the physical properties of the nodular iron castings are very similar to those of heat treated “pearlitic malleable castings.”

After Morrogh's historic announcement things moved rapidly in the nodular iron castings field. The International Nickel Company announced that it had perfected a process for making “spheroidal” graphitic carbon in cast iron, by adding various alloys of magnesium. (*Iron Age* Feb. 17, 1949)

The theories of nodular formation were excellently advanced by Professor De Sy, of Belgium. (*American Foundryman* Jan. 1949)

A very complete report on experiments at the American Cast Iron Pipe Company was published by C. K. Donoho in the *American Foundryman*, Feb. 1949. Magnesium was used in various alloys and tensile strengths up to about 125,000 psi were obtained. In



E. K. SMITH

some cases over 20 percent elongation was produced. About 0.5 percent magnesium was found to be effective as a ladle addition, as generally only about 10 percent of the magnesium is retained in the iron.

The patent situation must be clarified before full advantage can be taken of this great metallurgical achievement. It has been stated that a number of patents have been applied for by a number of individuals, but as yet the situation seems to be rather involved. In the meantime, it is believed that many foundries are experimenting independently.

The present author ran a series of experiments, using both Cerium and magnesium. Cerium was discontinued because of the necessity of having a base metal with very low sulphur and phosphorus, together with high silicon and carbon. Magnesium gave excellent results when used in a suitable base metal. The alloy of 50 percent magnesium and 50 percent copper was easy to break, and did not have so violent a reaction as pure magnesium, which is not recommended for ladle additions. With ordinary cupola iron, the rather high sulphur prevented the formation of nodules, as most of the magnesium was used up in desulphurizing the iron.

Best results were obtained by using a low sulphur, electric furnace cast iron for a base metal. The addition of magnesium-copper to this base, invariably resulted in the formation of nodular graphite, with excellent physical properties.

Figure 3 shows the etched structure of a nodular iron test bar. It will be noted that most of the graphite is in spheroidal form, but some is in small knots, or "nodes." (Magnified 500x)

• Fig. 2. 100x unetched. Nodular iron.

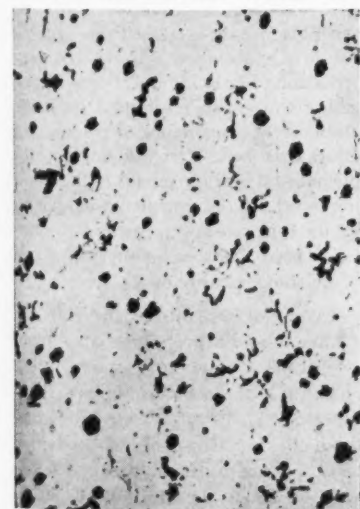
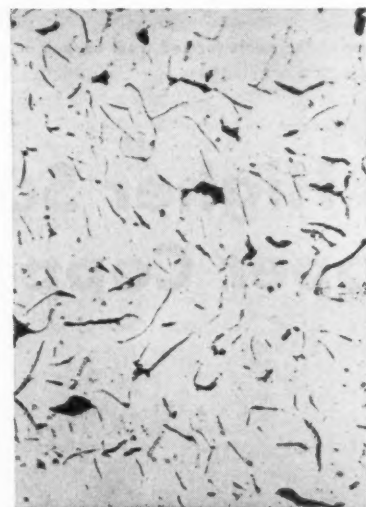


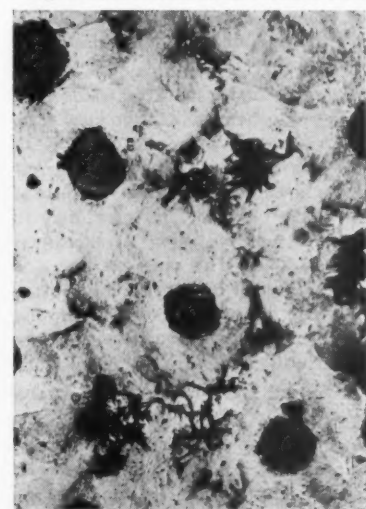
Figure 4 is of the same iron, but at 1000 magnification. One spherule of graphite is seen with two short thick flakes, such as Morrogh calls "quasi-flakes." There is a relatively small amount of ferrite, and the greater part of the area is pearlite, which explains the high strength of the casting. (Over 100,000 psi tensile strength.) Aside from the graphite, both the fracture of this metal, and its microstructure, resembles steel castings of similar strength.

Complaints have been reported that additions of magnesium to cast iron have not given uniform results. However, in the experiments cited, results were uniform and dependable, when the base metal was carefully checked, and ladle additions of magnesium accurately made. Sufficient magnesium had to be added to retain at least .07 percent



• Fig. 1. 100x unetched. Grey cast iron.

• Fig. 3. 500x etched nital. Nodular iron.



in the iron. "As cast" physical properties were approximately: tensile strength 100,000 psi, elongation 6.0 percent, Brinell hardness 248, machinability good.

In making any additions of any grades of magnesium to molten iron, precautions should be taken to prevent burns, until the operator is accustomed to the process. The writer prefers to cover most of the ladle with a steel plate, then drop in the magnesium alloy one piece at a time. Magnesium boils at temperatures below that of the molten iron, so the action is almost explosive.

After the magnesium reaction stops, .20 percent Silicon, as 85 percent Ferrosilicon is added, metal is skimmed, and castings poured.

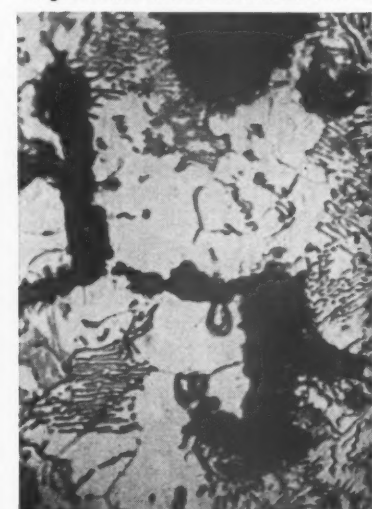
Nodular iron castings would seem to have great possibilities, where high strength, moderate ductility, and good machinability are required to make a rough comparison of physical properties:

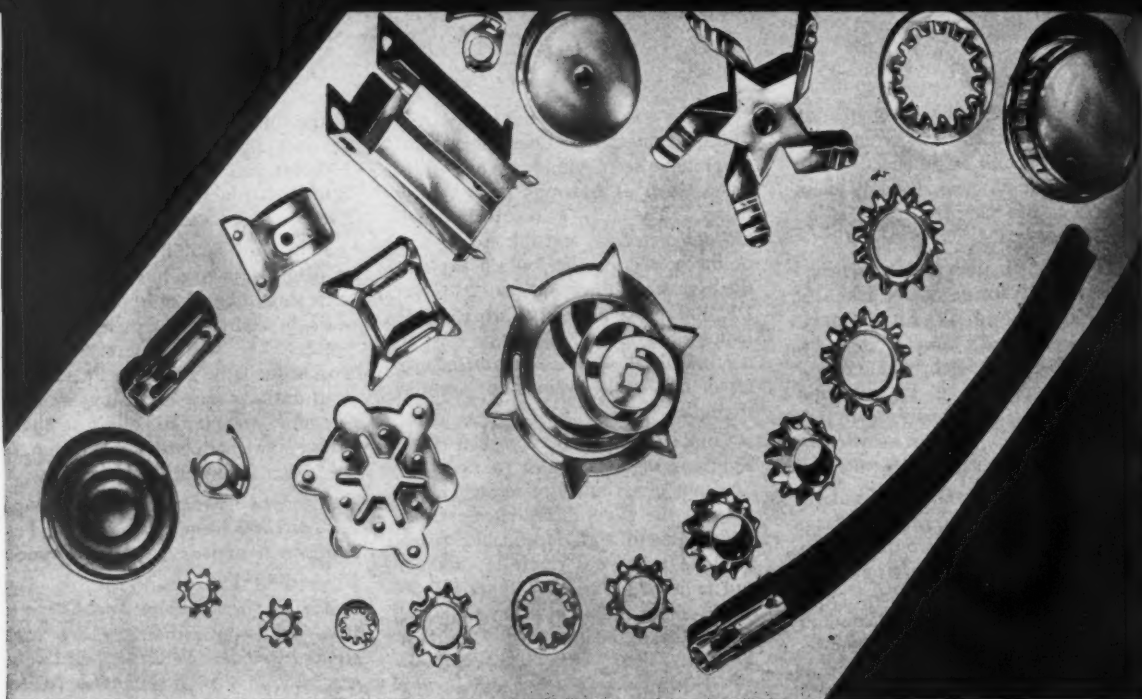
	Tensile Strength psi	Per cent Elongation
Gray Cast Iron.....	40,000	0
Malleable Castings..	52,000	20.0
Steel Castings	80,000	20.0
Nodular Iron Castings	100,000	7.0

Nodular iron castings can be made in cupola, air furnace, small open-hearth, or electric furnace, but at present the electric furnace seems best.

The most attractive feature of the nodular iron castings, from the metallurgical standpoint, is that the surface has barely been scratched. When one considers other combinations of addition-metals, other methods of making the additions, and other heat-treatments, it looks as if an entirely new era is about to open for castings.

• Fig. 4. 1000x etched nital. Nodular iron.





• Above, some of the parts formed from copper or brass alloys.

Same Cost, Higher Sales Appeal With Proper Copper Alloy

THE many methods available for forming metals and the large number of alloys, each with its own characteristics, often make the proper selection of material and methods a difficult problem for even the most experienced.

Some parts are so critical in their requirements that the proper selection of material may mean the difference between a profitable or a costly item, or may even determine the possibility of making it at all.

The ultimate consumer sees only two things in a finished article—quality and cost. These combine to determine the salability of the product and further narrow the choice of manufacturing procedure and metals.

Several questions face the manufacturer in evaluating the salability of his product: Am I using the most economical method of production? Can more expensive raw materials make the same product in fewer operations thereby giving me higher quality at the same or less cost? Am I taking full advantage of the characteristics of the materials I am

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Los Angeles Plant

now using to reduce operations? Am I buying and stocking several different materials when they could be grouped together to form one or two items by adjustments in design? Am I buying in the most economical sizes and quantities for my product?

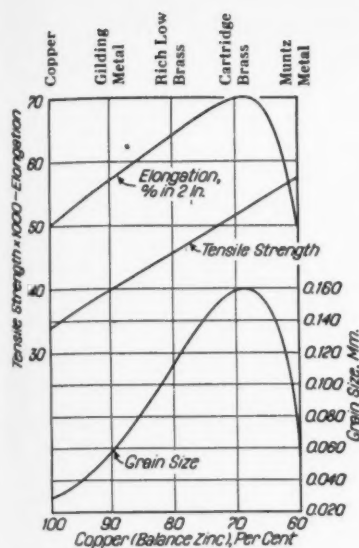
Modern manufacturers are too busy with production problems to keep track of the rapid advance in engineering alloys and methods. They, therefore, rely upon the engineers and metallurgists of producers of metal and machinery to keep them informed of advancements in their fields. This must not be a one way transfer of information. Too often the perfect answer is passed by because of incomplete understanding of the characteristics required in the product.

Salability has often been determined by tests available to the ultimate consumer at time of purchase. Tests such as tradition, experience, color, weight, rigidity, finish, etc., are many times the

deciding factor between two products of similar performance. It does not follow, however, that increasing the appeal increases the cost.

As an example, the traditional appeal of the yellow metals and the use of the notation "solid bronze," "solid copper," "solid gold" have great effect on salability, yet the increased raw material cost may be absorbed in lower tool costs, reduction of drawing operations or polishing time. The traditional long life and corrosion resistance of copper base alloys has been demanded from the glamour roles of ornaments to the working level of the petroleum refineries, yet the entire cost of the metal has sometimes been absorbed in the lower cost of finishing, plating or replacement.

Choice of the metal: although the combination of properties of copper, workability, corrosion resistance, color, electrical and thermal conductivity and others are such that it is used for many products, from electrical springs to food kettles, it is also desirable to investigate some of the many alloys of copper in



• Figure 1 General Influence of copper content on properties of annealed brass.

choosing a material for a product. It is usually possible to maintain most of the desirable characteristics of the metal, yet increase those properties which assist the manufacturing or service conditions of the products.

For example, the addition of zinc, silicon, nickel or tin, or combinations of these and other metals within commercial ranges, will increase both strength and ductility, making possible deeper draws with higher mechanical properties. Cartridge brass, having 70 percent copper and 30 percent zinc is an excellent example of this, and derives its name from its use for the rigid requirements of ammunition cartridge cases. Its name, though descriptive and complimentary, is not too appropriate, since this alloy contributes largely to our peace-time commerce.

Figure 1 shows effect of addition of zinc to copper on the annealed properties of the resulting alloys. Figures shown are approximate.

Addition of silicon to copper increases its elongation, strength and weldability, making possible drawn chemical tanks and vessels and hot water storage tanks with equal corrosion resistance and lower finished cost, even though the price of the silicon bronze in the raw state is higher than that of copper.

Nickel silver, a combination of nickel and zinc with copper, makes a corrosion resistant alloy with a pleasing warm silver color which affords an ideal base for silver plating. This alloy, too, has the workability characteristic of copper alloys.

Aluminum, tin, and lead also modify the fundamental characteristics of copper to provide properties ideal for different situations.

The combinations of properties obtained by careful selection of alloying elements by a skilled metallurgist and engineer are so numerous that it is highly desirable for the manufacturer to consult with the producer before deciding upon any one alloy or process for his product. A rough table of the principal alloys of copper and their relative properties is given in Table 1.

All manufacturing processes known to the metal industry can be used in fabricating the alloys of copper, though not all processes can be used with all alloys. It is desirable, therefore, that the fabricator present his problems and product to the engineers of the metal producer and that he in turn, become familiar with equipment and production methods which the fabricator has available.



J. A. KAVENAUGH

It is then possible to select the metal best suited to the fabricator's operations. It often happens that the producer can suggest altering of alloy composition or control of physical properties to eliminate an operation or to change it to a less expensive one.

Each product has some requirements as to the physical properties it must have after fabrication. The fabricating procedure will determine to a large degree the final properties within the limits of the selected alloy. These final properties are affected by each operation performed on the metal, and by the original properties as produced in the mill. Every fabricating process in turn has requirements which the metal must meet.

In order to meet demands on the metal at all stages and in the final form,

TABLE I
GUIDE TO THE SELECTION OF COPPER-BASE ALLOYS

Alloy	Color	Raw Material Cost	Strength	Formability	Resistance Welding	Tarnish and Corrosion Resistance	Other Special Qualities
Copper	Red	2	1	1	5	*	Heat and electric conductors
Gilding Metal 95%	Gold	2	1	1	5	*	Gold plate base
Com'l Bronze 90%	Bronze	2	2	2	4	*	Low cost
Red Brass	Red-Yellow	1	2	2	4	Salt water resistant	Low cost bellows
Cartridge Brass	Yellow	1	3	2	3	Sulfide resistant	General drawing
Leaded Brasses	Yellow	1	3	Chollow Draws	4	Sulfide resistant	Stamping
Phosphor Brasses	Bronze	6	6	1	1	Salt water resistant	Springs wear resistance
Cupro-Nickels	White	5	3	3	1	High velocity, salt water resistant	Corrosion resistance
Nickel Silvers	Tinted White	3	4	3	2	Fruit acid & fco's	Springs—silver plate base
Silicon Brasses	Bronze	3	5	3	1	*	High strength welded parts
Aluminum Bronze	Gold	4	3	2	1	Acid resistant	10% lighter than copper
Tin Brasses	Yellow to Bronze	2	3	2	2	*	Ornaments
(Silicon or Manganese Brasses)	Yellow	2	3	2	2	*	Resistance welding Brasses

CODES:
Cost: Highest number is highest cost.
Strength: Highest number is highest strength.
Formability: Highest number is greatest resistance to forming between anneals.
Resistance Welding: Highest number is most difficult to weld.
*Corrosion Resistance: All copper-base alloys have excellent general corrosion resistance to most mediums. Table shows only special characteristics in this respect.

COPPER AND BRASS (From Page 41)

it is necessary that the mill produce the metal in exactly the proper condition. This may require special handling by the mill in some severe cases or may require compromises or additional operations by the fabricator in others.

Sheet and strip is produced in the mill by rolling a casting—sometimes hot and sometimes cold. Many years of experience in the rolling of metal is required to set up proper mill procedure to obtain the desired finished characteristics. Data taken by engineers at the customers' plants is given to the mill

metallurgist who, basing his judgment on charts and graphs accumulated from the many similar requirements previously encountered, lays out the procedure to be taken in making that particular customer's material.

This control begins with a chemical analysis of the casting and continues by specifying exactly how much squeezing the metal is to be given every time it passes through the rolls. At certain stages it is annealed or softened at very definite temperatures for specific lengths of time.

It is important that each process be

carefully controlled, since characteristics are given by each which cannot be eliminated by subsequent operations. This explains why a fabricator who does not take the producer into his confidence may receive materials with different characteristics when he merely orders the temper as "two numbers hard" from several mills. Each mill will try to guess his application requirements and furnish different mill rolling procedures.

In order that the physical properties are as required in cold rolled metal, the

BRASS TEMPER SELECTION CHARTS SHEET, STRIP AND ROLL BRASS

All photomicrographs mag. 75X.

- I. SPECIFY THE ALLOY!
- II. SPECIFY THE TEMPER!
- III. SPECIFY THE USE!

FOR SPECIFIC APPLICATIONS:

ANNEALED or SOFT METAL

Recrystallized Grains

Produced by Annealing Hard Metal at Temperatures
600° F—1200° F

HARD or COLD ROLLED METAL

Distorted and Broken-up Grains

Produced by Cold Rolling Soft Metal to the Finish Thickness

COMMON TEMPER NOMENCLATURE

Extra Deep Drawing Anneal Temper (Over .050 mm. Average Diameter grains)	Deep Drawing Anneal Temper (.050 mm.-.040 mm. Average Diameter grains)	Light Anneal Temper (.040 mm.-.015 mm. Average Diameter grains)	¼ Hard Temper (1 Number Hard)	½ Hard Temper (2 Numbers Hard)	¾ Hard Temper (3 Numbers Hard)	Full Hard Temper (4 Numbers Hard)	Extra Hard Temper (6 Numbers Hard)	Spring Temper (8 Numbers Hard)	Extra Spring Temper (10 Numbers Hard)
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COMMON TEMPER USES

Special Cases of Deep Drawing and Spinning Consult Tech. Service Rough surface on drawn parts not suitable for polishing Select Proper Alloy	Common Soft Temper for Deep Drawing and Spinning Surface on drawn parts suitable for most polishing requirements Select Proper Alloy	Special Soft Temper used for Moderate Drawing and Cupping Drawn part surfaces suitable for polishing Select Proper Alloy	Special Hard Temper Suitable for Shallow Forming Select Proper Alloy	Common Hard Temper Suitable for Sharp 90° Bends Slight Radius for Leaded Brasses Select Proper Alloy	Special Tempers of Hard Brass Suitable for 90° Radius Bends Harder Tempers require greater bend radii Spring Tempers require very liberal bend radii Select Proper Alloy Not Obtainable in "Patent Leveled" Sheet or Strip
Hard tempers favorable to blanking, shearing, and machining					

NOTE Commercial Bronze, 90%; Red Brass, 85%; and Low Brass, 80%, have same annealing nomenclature but grain sizes over .050 mm. not available.

correct amount of cold rolling must be done from a definite physical condition at a definite thickness. This cold reduction is measured in "Number of B&S gauge reduction in thickness."

The B & S gauge for thickness measurement is a geometric progression where each gauge is approximately 11 percent thinner than the next smaller gauge number. Consequently, a reduction of 2 B&S gauge numbers would represent the same percentage of work and the same physical properties (from the same ready-to-finish grain size) regardless of whether the reduction is from 16 to 18 gauge or from 20 to 22 gauge. Such metal is commonly referred to as "2 numbers hard" or as $\frac{1}{2}$ hard.

Metal used for drawing and spinning is usually annealed after reaching the proper thickness. Temperature and time of the final annealing is again carefully controlled to provide the proper condition of the metal. Whereas grains of metal become smaller and stronger as metal is cold rolled, they become larger and more ductile as temperature of annealing is increased.

If grain size becomes too large from annealing operation, they will become visible any time the metal is stretched, as in bending or drawing. This effect is known as "orange peeling" because the appearance of the surface is similar to an orange. This surface is difficult to buff to a high polish and, therefore, parts which require a good finish are made from metal with a grain size below .050 millimeters in diameter even though the metal is not in a condition for maximum drawability.

Parts requiring only moderate drawing or cupping and considerable strength, may be made from a finer grained metal such as .025 millimeters in diameter or finer. Those special cases where the ultimate in drawability is required may have a grain as large as .100 mm. Such parts will show a rough surface after forming, however.

Extremely deep or complicated parts will on occasion require more than one drawing operation, sometimes with an annealing operation in between. It is particularly important that the producer be advised of such a condition, since the properties of the metal after this process anneal are dependent to a large degree upon the ready-to-finish anneal.

In no case will grain size on the final anneal be less than that of the ready-to-finish grain size, and it may be much larger. In other words, raw material cannot be supplied in a large grain for maximum drawability and then process annealed for further drawing so that a fine grain for polishing will result.



• A prime example of deep-drawing of properly alloyed metal, with optimum results.

Two case histories illustrate the principle of correct application of materials to a product:

(1) Motor cases of the Telechron Kitchen Clock must be made of a metal which not only is non-magnetic and possesses some structural strength, but also must be able to take eight drawing operations in an eyelet machine without annealing.

Through close collaboration between engineers of Telechron and Revere, certain changes were made, including the selection of commercial bronze (95 percent copper 5 percent zinc) as the alloy with the best combination of properties for this application. This alloy has excellent formability, low cost and sufficient structural strength as shown in Table 1. No anneals are necessary to produce the case. Production was stepped up, rejects reduced and marked economies were obtained.

(2) Necessity for grain size control as well as alloy control is demonstrated by the electric percolator manufactured by Manning-Bowman Company of Meridian, Connecticut and shown above. Requirements of the metal include good formability, medium strength and excellent polishing and plating characteristics. The choice of red brass 80

percent is logical according to Table 1.

The first two draws are followed by an anneal at 1100° F for 15 minutes. Then there is a reverse draw in which the annealed shell is turned completely inside out. This gives additional depth to the shell and, at the same time, results in the pressure pad flange required for all subsequent operations.

Before the engineers of Manning-Bowman and Revere made a mutual study of the problem, to establish the precise grain size control for the metal, it was occasionally necessary to smooth the sidewall of the shell produced by the last draw, by an additional spinning operation. Recommendations, not only with respect to raw material as received by the customer, but in various processing steps, have assisted toward a substantial reduction in costs of shell production and likewise in the cost of polishing and buffing before plating.

Similar cooperation by the supplier is available to all metal fabricators and is being utilized throughout the country today to produce better and less expensive products.

BIBLIOGRAPHY

- L. E. Gibbs, Cartridge Brass, Metals Progress, June and August 1943
- R. A. Wilkins and E. S. Bunn, Copper and Copper-Base Alloys, McGraw-Hill, New York, N. Y., 1943

Aluminum Products Easy to Make If Proper Technique is Used

ALUMINUM is indeed the metal of new uses. Its excellent combination of desirable characteristics has dictated its use for hundreds of new postwar products in practically every field of manufactured goods. Many of these new uses have originated on the West Coast.

Adaptability of aluminum has been a source of much confusion to many, even those with long experience in the manufacture of metal products. Almost daily, new applications are being conceived.

Because of the West's vast distances, transportation is vitally important. Aluminum is playing an important role in this vital service, and a high percentage of heavy trucking in the West is carried in aluminum truck trailers at savings to both shippers and operators.

The bottom dump unit is almost unique to this area, and within the past year a number of aluminum units have been built which are piling up enviable transportation records hauling cement and sand and similar bulk commodities.

This type of unit is nearly always loaded to the permitted limit, so the extra payload, average 10 per cent, that light weight aluminum construction achieves is a real money-maker to the operator. In a recent bid for hauling more than a million barrels of cement, revenue from this bonus amounted to more than the entire profit on the contract.

A similar unit of equipment in many ways is the tank trailer, and before this year is out many aluminum units will be on the road—with the interesting 10 per cent bonus load for the operator.

Trucks and tractors are also getting their share of attention in the effort to reduce deadweight. Aluminum is being used increasingly for motor castings, wheels, brake drums, spring hangers, axle housings, chassis rails, cabs, bumpers, hoods and fuel tanks. Aluminum construction is proving to be extremely

By **FLOYD R. CARPENTER**, *Manager
Development & Engineering Division
Permanente Products Company*

sturdy for both highway and off highway work.

The Tote Box system of handling bulk commodities as conceived by the Tote Engineering Co., Seattle, is a new and interesting approach to handling problems promising new economies and efficiency. This is an aluminum box, a basic transportation unit, that holds about 3000 pounds of flour. Its bottom is in effect an eight-way pallet for easy handling by fork lift trucks. All corners are smooth and flush, important for sanitation. Tote Boxes are now in service shipping flour from mill to several large bakeries.

Aluminum is just breaking into the field of food handling, in the field, in the cannery, and in the store, but it promises to be a lively contender in the future. In the past, wood has been the traditional material for field lugs, shipping crates and boxes, pallets and other items of handling equipment.



FLOYD R. CARPENTER

While wood has served the purpose well, it has definite limitations: it is easily damaged and requires extensive repairs, it soaks up considerable moisture; it is unsanitary, harboring bacteria, and it is difficult to clean and sterilize; it is a fire hazard, especially in off-season storage of lugs in mountainous piles.

Initial cost of aluminum in such uses will be higher, but over-all economies look promising. Maintenance costs will be lower. Handling is easier and cheaper. Even damaged equipment has considerable scrap value. There is a good possibility aluminum lugs and similar items can be capitalized, and there should be a reduction in fire insurance rates.

The real emergence of aluminum is in the building products field, where the list of successful applications is almost endless. Better than a third of all aluminum goes into this field, which is by far the largest present outlet. Several factors are responsible: corrosion resistance, non-staining, lightness, high reflectivity to solar heat (which means buildings are cooler)—especially important to farm production as well as to human comfort and efficiency.

Along with high reflectivity to solar energy aluminum also has a very low emissivity to long wave length energy, which makes it particularly adaptable to heating duct work. Actual tests show bare aluminum ducts are far more efficient than painted or asbestos-paper covered metal ducts, and compare favorably with insulated ducts employing 1/4-inch cellular asbestos insulation.

Corrosion resistance is probably the most important characteristic of aluminum, dictating its choice for building products. Aluminum weathers to a soft gray color which is in reality a buildup of aluminum oxide on the surface much the same as the characteristic green oxide which appears on copper. It is nature's way of protecting,

with tightly adherent film which builds up quite rapidly. The heavier the film the more protection it provides.

This is in contrast to zinc coating on steel, which finally dissolves, exposing bare steel to oxidation (rust). Rust or oxide film on steel is not tightly adherent but flakes off, exposing new steel which in turn rusts, resulting in fairly rapid deterioration unless paint or other protection is applied.

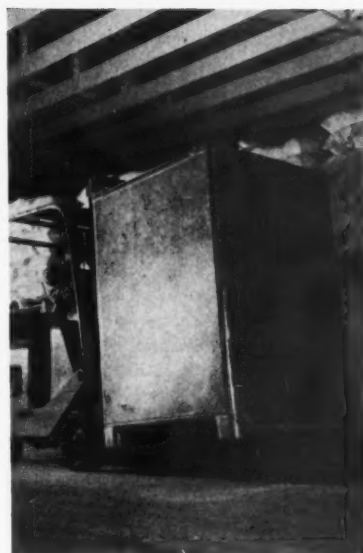
Many current users of aluminum are not aware of all the possibilities inherent in this metal and are not taking full advantage of all its desirable characteristics.

Development of some of this multitude of new products has been made unduly difficult by a lack of understanding, particularly of the variety and properties of commercially available alloys. In many cases, the development and engineering division of Permanente Products Company has been of material assistance to a fabricator in design and guiding proper and economical use of aluminum.

Here is a recent case. A manufacturer wished to form a part requiring reasonably high strength. His first interest was in 75S because of its strength, the greatest of any commercially available aluminum alloy. However, 75S must be formed in the annealed or "O" condition and the part heat-treated thereafter.

Full study of the problem showed that 52S in one temper provided adequate strength, while it possessed good forming characteristics and did not require heat treatment. Needless to say, the change in alloy resulted in material and fabrication savings.

Best results obviously can be obtained only by carefully considering all appli-



• Aluminum tote boxes, designed to hold 3000 pounds of flour, and with bottoms acting as built-in pallet, step up the handling problem in several bakeries.

cation factors such as forming methods, joining and assembly problems and ultimate finish desired. Straight review of mechanical properties does not provide a satisfactory answer.

For example, the properties of 52SH-38 may look attractive to a designer, but associated with this hard-temper material is poor formability and a lack of flatness. Therefore, if the article requires physical properties approaching that of 52SH38 a good alloy selection is 61ST6 and if forming requirements are severe the T4 temper can be used, and age harden the finished article to the T6 temper.

Similarly, corrosion resistance, joining and finishing methods affect the

choice of alloy. It is not recommended that the high strength alloys 24S and 75S be fusion welded although the clad varieties may be successfully spot welded.

Therefore, if fusion welding is contemplated it is necessary to use a lower strength material with heavier section even though the mechanical properties of 24S may be desirable. In this case, it is probably expedient to consider riveted connections instead of welding in order to use the higher strength alloy successfully.

There will also be exceptions, some of them important, but it is felt that the following outline fits the general picture of alloy selection. Temper selection should almost always be supplementary to alloy selection.

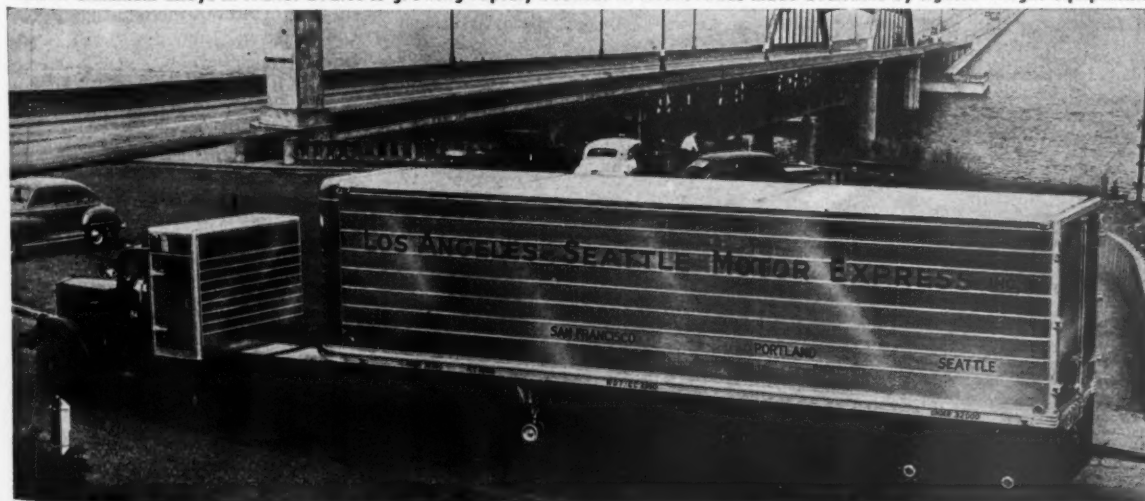
Group 1—High Purity and 2S

Use of aluminum in the chemical industry is well known and applications in this field are among the oldest.

Hydrogen peroxide drums and acetic acid drums, as well as nitric acid drums, have been made of aluminum for many years. Aluminum has been used for distilled water containers and for ammonium nitrate solutions in the explosives industry. Kettles used in food processing and in the production of varnishes and resins have been made of aluminum. No hard and fast rules can be laid down between the selection of high purity aluminum and 2S (or possibly one of the stronger alloys). In the chemical field probably more than in any other, it is necessary that tests be made before final selection of the degree of purity required for a particular part.

Since all of the aluminum alloys are relatively good heat reflectors, more consideration is given the matter of

• Use of aluminum alloys in trailer bodies is growing rapidly because of bonus loads made available by lighter weight equipment.



ALUMINUM (Continued from Page 45)
purity for light reflection applications than for heat reflection. High purity metal takes an excellent electro-brightened finish, used for light reflectors.

As an electrical conductor material, aluminum having a minimum of purity of 99.45 is equivalent to 61 per cent of the annealed copper standard. This purity is widely used for power transmission. Aluminum is used in the hard drawn temper and has about the same physical properties as annealed copper.

Group II—Utility and 3S

This group would be classed as the newest and (potentially at least) one of the largest. Ducts, flashings, and general utility work performed by sheet metal shops all over the country would fall into this group. Here we find aluminum as the "successor" to galvanized iron.

It is interesting to note that at least one progressive manufacturer of downspouts, gas heater vents, etc., has preferred in the past to use 52S for such applications because of its ruggedness as compared with 3S and Utility Sheet. Recently, however, this manufacturer has switched to our 150 alloy.

Group III—2S, 3S, 52S, 150S

Aluminum is now firmly established as a material for pots and pans, refrigerator parts, dispensing machines, office equipment, household appliances, high grade architectural work and many other applications. At the same time, this is one of the most fertile groups for careful study of alloy selection.

2S is included in this group more from the standpoint of tradition than from actual need. It has been used for two types of applications:

1. For products made by spinning (lamps, ice buckets, bun warmers, etc.) mainly because of its ductility. This has worked out satisfactorily where sheet of fairly heavy thickness was used for

Group	Sheet Alloys	Application Types
I	High Purity (99%+) 2S	Chemical, Reflectivity, Conductivity
II	Utility 3S	General Sheet Metal Work, Low Cost Fabricated Products
III	2S 3S 150S 52S	Medium and High Grade Manufactured Products
IV	52S 61S	Transportation, Containers and Handling Equipment
V	61S 24S 75S	Aircraft, Structural Applications, Abrasion Resistance

articles already substantial by reason of their design. On the other hand, it is believed aluminum has been used improperly for spun applications where surfaces receiving little or no cold work were involved.

2. In applications calling for a highly decorative effect, such as doors for ice cube compartments in refrigerators. It seems likely, however, that alloys of the 150S type will replace 2S for such applications.

3S has been the key alloy for applications in this group, particularly in the kitchen utensil field. Due to habit and to its low cost, 3S has undoubtedly been used when other alloys would have been better, but it must be admitted that this alloy has done much to put aluminum in its present high place in industry.

52S has probably been used for more diverse applications than any of the other alloys. From venetian blind slats to eyelets, from dishwasher tubs to fan blades to pressure vessels, 52S has been a sort of "war horse" among aluminum alloys.

The recently announced 150S has many of the desirable characteristics of both 3S and 52S and may be classified broadly as a "manufacturers' sheet." There is already considerable interest in this material. 150S has been used for such diverse applications as irrigation

pipe, store shelving, vending machines, refrigerator parts (ice cube grids, crisper pans, decorative panels), household appliances and cooking utensils.

Of particular significance is the fact that substantial poundage has been converted upward from 2S and 3S to 150S, rather than from 52S. This seems to indicate that fabricators are interested in improving the quality of their products if this can be done at reasonable cost.

In connection with drawn parts in general, the rate of work hardening of 150S is considerably higher than that of 3S, and dent resistance of surfaces subjected to drawing is likely to be far better than that of 3S.

Group IV—52S and 61S

In this group are such applications as truck, trailer, and bus bodies, milk crates, handling equipment, tank trucks, farm implements, boats, and similar structural applications. For members requiring considerable forming, the choice between 52S-H34 (52S $\frac{1}{2}$ H) and 61S often calls for very good judgment.

Group V—61S, 24S, and 75S

Factors involved in alloy selection in this group are relatively well understood.

For airplane structural members and other structures of the same nature, cost consideration (and tradition) sometimes dictates the choice of 24S in preference to 75S, but it is apparent that there is a definite trend in the direction of 75S.

75S is also the accepted material for keys, due to its abrasion resistance and high strength.

For structural applications 61S should not be overlooked as a good possibility, particularly if formability is an added consideration and if the full strength of 75S is not needed.

Many difficulties which some fabricators have had with aluminum are directly traceable to choice of alloys not suited to the particular purpose. Others come from inexperience in working with aluminum.

• Good forming characteristics of 150S aluminum alloy are illustrated in this vent.



Putting Shine on Stainless Steel Weakens All But Sales Appeal

GLITTERING pots, modernistic architectural columns, and decorative cheesecake of shiny stainless steel are truly a delight to see. But such beauty on the surface of the metal contributes nothing to the optimum longevity of parts subjected to rigorous fabrication and service.

It may be lovely in the kitchen, but it leaves something to be desired in industry. The shine, and results of putting it there, seem to indicate that the efforts to attain the art are defeating the aim to serve science.

Through the eye, stainless steel is enhanced by the restoration of glamour. But through the microscope, the grains have often been practically isolated from their neighbors.

Sheet and strip probably represent the greatest volume of the forms in which this metal is used. Forming it in the annealed condition into intricate parts often requires intermediate stress-relieving which cannot be adequately accomplished by use of moderate temperatures at which heat discoloration will not occur.

Normal ductility of the metal is invariably lost by forming, and a final annealing operation is required in order to prevent residual stress-cracking or stress-relieving creep-phenomena which results in warpage. Here again, moderate non-discoloring annealing does not serve.

When annealing at higher temperature is employed, either an unsightly blackening or scale formations, or both, appear, and such a condition usually calls for strenuous cleaning.

The almost diabolical character of some of the common cleaning processes should be reserved for the laboratory. Many cleaning reagents in use are not inhibited to act selectively on the products of corrosion acquired in the prior treatments.

The action of cleaners is largely that of disassociation of hydrogen, which "blasts" corrosion products from the parent metal. By the same token, this violent atomic-scale ionization introduces concentration-cell activity in the readily or mildly susceptible (as the

By **KEITH F. FINLAY**
Metallurgist
Northrop Aircraft, Inc.

case may be) grain boundaries of the material. Certain appreciable, however microscopic, surface discontinuities are thereby created which eventually afford haven for whatever corrosive electrolyte presents itself to the material.

Removal of unwanted surface conditions resulting from processes of manufacturing in addition to chemical cleaning, include grinding, filing, sand-blasting, shot or grit-blasting, vapor-blasting and tumbling.

Grinding is quite commonly employed to "clean weldments." It is common knowledge that dissolution of normally corrosion-resistant chemical compositions often occurs in the heat-affected zone of welds in stainless steel. Disturbance of the surface thus made more susceptible to corrosive media is almost inevitable.

No matter how great the ardor a grinder has for his assignment, he is liable to gouge adjacent material. "Dressing" welds is a major source of their failure in service.

Filing may be classified as grinding.



KEITH F. FINLAY

Sand-blasting is similarly uninhibited as are the chemical cleaners already discussed. Abrading action of sand does not cease with removal of the undesirable surface, but continues to rip and tear the surface of underlying material.

Incredible as it may seem, the unpleasant and unaesthetic surface before blasting is superior to that of the sand-blasted surface from the standpoint of service-life, in all but the most protected instances.

Shot or grit-blasting probably provides the least advantage to a stainless steel part of any of the mechanical cleaning methods in use. In addition to the deleterious effects of creating the mutilated surface obtained by sand-blasting, iron particles from the grit or shot are entrained in the furrows which result from this abrasive action.

These iron particles tend to accelerate deterioration of the steel by way of sustained bi-metal potential electromotive action. This type of corrosion is insidious to the extreme.

Cleaning effected by the impingement of high-velocity water carrying fine abrasive particles produces an almost burnished appearance to the unaided eye. Microscopically, however, this surface is fraught with the same mutilation described as resulting from sand-blasting.

A truly burnished surface affords very little opportunity for an electrolyte to gain a foothold; but a surface such as is generated by vapor-blasting is very susceptible to corrosion.

Tumbling of small parts to dislodge scale and remove discoloration produces some or all of the conditions pointed out as resulting from other cleaners. It is conceivable, however, that this method, under closely controlled conditions, might be advantageous.

It is true that many parts manufactured from this metal have the looks, the eye-appeal and the sales appeal with which the general public associates the term "stainless-steel." But this word-association is a serious deterrent to the thinking of practical-minded metallurgists and metallographers, as well as to the manufacturers.



Hot Dip Galvanizing Aids Life, Opens Uses for Iron, Steel

SCARCELY more than 100 years ago, there was no practical large scale method of permanently rust-proofing iron or steel. In 1837 the first English patent was granted for what is now known as hot dip galvanizing.

The first effect of this discovery was to lift the zinc industry out of comparative obscurity. But the most important effect, one which greatly influences our lives and pocketbooks today, was the way in which this process enhanced the value and extended the practical uses of iron and steel.

Rust's destructive power is even more important today than it was a century ago. Bridges and homes, utilities and communications, to say nothing of gad-

By WILLIAM A. GRANGE
Galvanizing Division Manager,
Hubbard and Company Oakland Plant

gets and equipment, depend on iron and steel which must stand up year after year under every condition of exposure.

Wide recognition of the economic value of hot dip galvanizing is illustrated by the fact that about 40% of the approximately million-ton U. S. zinc consumption goes into this process. Even in 1939, a typical pre-war year, American industry used almost 270,000 tons of zinc in the hot dip galvanizing process to protect some 3,500,000 tons of iron and steel.

Yet a closer study of the sound economic value of hot-dip galvanizing leads us to wonder why its use is not even more widespread. Perhaps this is partly due to the fact that galvanizing of a sort can be produced under crude operating conditions. This has led to entry of some poorly controlled products into the market, with the result that some uninformed people may have lost a certain amount of confidence in the process.

Today, fortunately, minimum standards and practical tests have been established by reputable individual firms and through the efforts of such independent organizations as the Pacific

Coast Galvanizers Association. Thus it is possible to rely with confidence on the protection afforded. The modern plant is prepared to offer controlled pre-processing, metallurgy, and dipping temperatures for every type of product from small mass-produced items to huge 40-foot eye beams.

From a dollar and cents standpoint, properly controlled hot-dip galvanizing may be depended upon to pay its way many times over in two important ways. First, galvanizing after fabrication, by offering the most complete practical protection available against rust, multiplies the life expectancy of any iron or steel product. Second, it eliminates once and for all the everlasting upkeep cost of painting and repainting, year after year . . . often at little more initial cost than an original paint job. In architecture, it also eliminates many exterior redecorating projects which would otherwise be made necessary by rust-stains carried from steel reinforcements or hardware to masonry and stucco work.

Still another factor is important, particularly in the consumer goods field. The clean, bright appearance of galvanized products offers distinct eye-appeal, and the advantages of rust protection present an undeniable sales point.

There are two good logical reasons why hot-dip galvanizing has come to have such wide acceptance as the ultimate in rust protection.

First, zinc is known as an ideal "sacrificial" protector. If damage should occur and cause a tiny break in the coating so as to allow moisture to penetrate to the base metal, the ensuing electrolytic reaction would cause a small amount of the zinc to go into solution as zinc oxide

which would be deposited on the iron and virtually plug up the "pore." Thus, part of the zinc coating is sacrificed to protect the iron or steel beneath. This is in sharp contrast to such coatings as tin, for instance, which produces the opposite electrolytic reaction, and actually promotes rust where breaks occur.

The second and most important advantage is that the hot-dip process produces a permanently bonded double coating. This consists of a thin layer of zinc-iron alloy merging from the iron or steel base into the pure zinc surface coating. No other process can produce this permanent bonding effect.

Necessity for careful control can be understood through a simple review of the basic process. Articles are first cleaned of all scale, rust or foreign matter by "pickling" in a controlled solution of sulphuric acid, or by tumbling or sand blasting. "Pickling" time must be long enough to do its job, but must be stopped before the acid can make appreciable attack on the metal itself.

Then, following a thorough rinse and muriatic acid flux, articles are dipped in zinc until they reach the temperature of molten metal. At this point, there are certain variations in practice. Our own procedure calls for withdrawal of material for a sal-ammoniac flux and a second immersion in the molten zinc. The flux causes the initial zinc coating to flow freely and smoothly over the entire surface, and the second immersion assures complete coverage with a pure zinc coating. It is obvious that perfect control of time and temperature are essential at these stages in order to obtain the precise required thickness of the zinc-iron alloy bonding, and to insure a pure zinc exterior.

Articles are then removed for vigorous shaking or tumbling to remove

excess spelter. Small mass-produced items are placed in a centrifuge to accomplish this purpose. Here, too, timing is essential as excess must be removed while the zinc is still in a fluid state. Contact with the air for a controlled period of seconds produces a microscopically thin surface coating of zinc oxide which is actually required to give maximum protection. A cooling bath stops this oxidation at a critical point, after which the articles are inspected and readied for shipment.

Standard tests have been established for various types of galvanized products for their respective types of services. The average coating required is determined on a basis of two ounces of zinc per square foot of surface area, although this naturally varies in relation to the metallurgy, structure, and end use of the product. Available tests determine both the thickness and uniformity of coverage. Samples of each lot should be subjected to the indicated tests, which in effect produce an accelerated corrosive reaction comparable to natural destructive forces of many decades or even centuries. This allows the user accurately to forecast the life expectancy of a product.

The ease with which equipment and materials may be galvanized after fabrication, points up the advisability of considering this process for almost every type iron or steel construction. It has proved its economic feasibility for major structural members of bridges. Architects often specify galvanizing for such uses as arch supporting eye-beams, thereby not only assuring permanent structural strength, but eliminating danger of unsightly rust stains carried by seepage to exterior finishes. Uses for commercial hardware and consumer items are too numerous to mention.

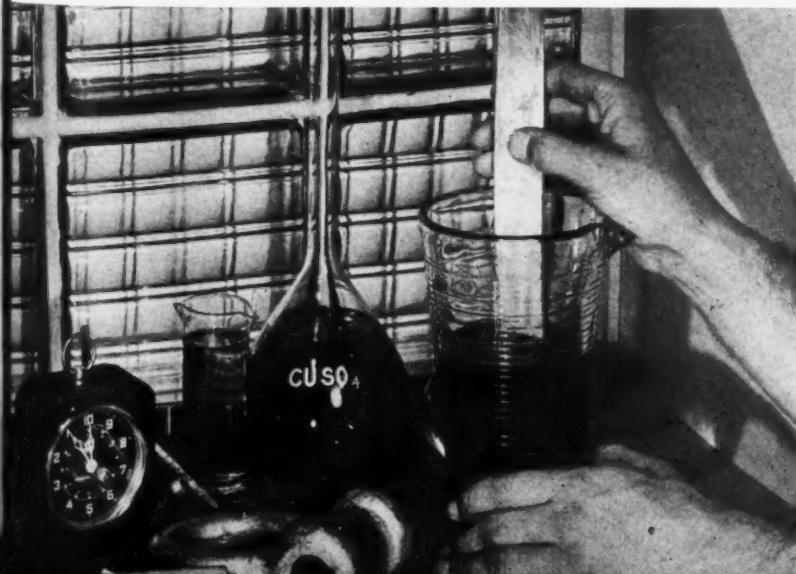
* Samples are subjected to a series of one-minute dips in a neutralized solution of copper sulphate with a specific gravity of 1.186 at 65° F. After each dip, samples are washed and wiped to remove copper deposit. This is repeated four to nine times, depending upon service requirements. A satisfactory zinc coating is indicated if there are no bright adherent metallic copper deposits within one inch of cut surfaces.

* In architectural as well as exposed applications, hot double-dip galvanizing has proved its economic value through lowered upkeep costs as well as an extended life of iron or steel members.

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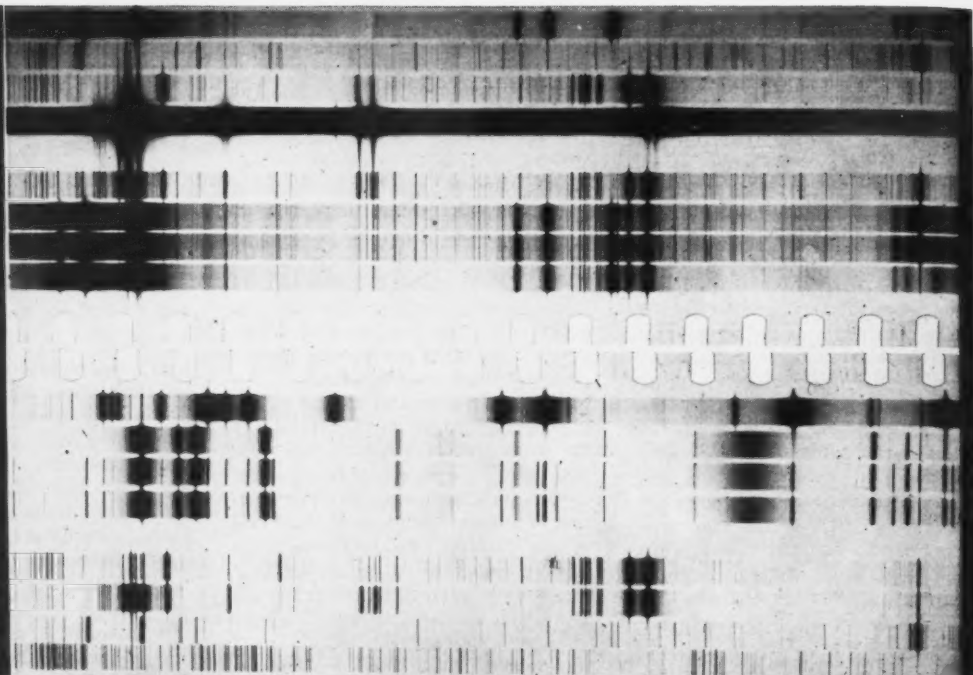


PURE ZN
PURE CU
PURE AL
PURE MG

HARDENER
KIRKSITE "A"
KIRKSITE "A"
KIRKSITE 3

PURE SM
PURE PB
4% SB PB
12% SB PB

KK 6 AL
24 S AL
BRASS
18-8 STEEL



• Characteristic recorded spectra on two 35 millimeter films. 16 spectrograms are shown.

Specification Zinc Base Alloys Developed Through Research

By **LESLIE LARRIEU**, *Chief Chemist*
Morris P. Kirk & Son, Inc., Los Angeles
(Subsidiary of National Lead Co.)

IN recent years we have witnessed the development, acceptance, and spectacular rise of the zinc base die casting alloys to a position of extreme importance in our industrial economy and consequently in our daily lives.

The development of these alloys resulted from a definite research program and the acceptance of them was inevitable because of their extremely low production cost. Their rise to importance was assured by universal use in the metal fabricating industry.

How the alloys are used, what they are, and how they were originated are interesting and appropriate preludes to a discussion of how they are manufactured within one of the strictest alloy specifications used today:

Use and Importance

Zinc base die casting alloys enjoy a very widespread use as low cost, mass produced, intricately designed parts. We use this alloy in our homes in the shape of pressure die cast parts for our

washing machines, vacuum cleaners, electric mixers, automatic record players, etc.

The average American accepts his automobile with all its appointments and refinements, little realizing that zinc alloy die castings have made most of these desirable accessories possible at low cost. The automobile industry in the last peace time year of 1939 consumed over 100,000 tons of Special High Grade Zinc in the form of pressure die castings. Indeed, the average medium priced automobile in 1939 contained in its finished structure some 75 pounds of the alloy.

By far the greatest tonnage of the zinc base alloys is consumed in the production of castings by the pressure die casting process. This process is essentially mold casting with pressure, and it is a characteristic of this alloy to faithfully duplicate very intricate designs in extremely thin sections when introduced in the liquid state by pressure into

steel die cavities. Castings produced by this method range in size from the tiny slide fasteners to frames for the complicated automatic phonograph record player.

Composition and Physical Properties

The zinc base die casting alloys are divided into three compositional groups on the basis of their respective copper content. The New Jersey Zinc Company trade name them all Zamak and our company, Morris P. Kirk & Son, Inc., manufacture them under "Zamak license" and trade name them "KirkSITE." The maximum impurity limits are the same for each alloy and are: 0.10 per cent iron, 0.007 per cent lead, 0.005 per cent cadmium, and 0.005 per cent tin.

These alloys possess the very desirable physical property of low melting point (717°F) and the excellent mechanical properties of high tensile strength (47,000 psi) with good impact strength (48 ft. lbs.).

The composition range for each alloy is shown in the table below:

	#3 "KIRKSITE" (3 Zamak)	#5 "KIRKSITE" (5 Zamak)	#2 "KIRKSITE" (2 Zamak)
Aluminum, per cent	3.5 — 4.3	3.5 — 4.3	3.5 — 4.5
Copper, per cent	0.10—Max.	0.75—1.25	2.5 —3.5
Magnesium, per cent	0.03—0.08	0.03—0.08	0.02—0.10

The more important physical and mechanical properties of the intermediate copper bearing zinc base alloy No. 5 "KirkSITE" (No. 5 Zamak) are¹:

Melting point	717.6° F.
Specific gravity	6.70
Weight per cubic inch.....	0.24 lbs.
Impact strength (Charpy)	
1/4" x 1/4" bar.....	48.0 ft. lbs.
Tensile strength	47,600 lbs.
Tensile elongation	7% in 2 inches
Brinell hardness	91

NOTE: The mechanical properties listed were determined on pressure cast specimens.

History and Research

The historical background of these alloys is one of engrossing interest because it is an epic story of applied research that was eminently successful. The zinc base alloys, as we know them today, are the direct result of this work that was undertaken as a research project by the capable metallurgical staff of the New Jersey Zinc Company some 25 years ago. Certain salient facts were presented to the metal industry in 1925, among which were the most successful combination of zinc, aluminum and copper, and probably most important of all, was the detection and understanding of the factors which had caused similar alloys to fail with monotonous

(1) New Jersey Zinc Company, Zamak Alloys for Zinc Alloy Die Castings, Research Bulletin, Third Edition.

regularity, after short periods of use, prior to this date.

The research workers determined this failure to be due to a form of corrosion, caused by the inclusion of small amounts of lead in the alloy; that it was intergranular in nature and proceeded by an actual migration of the contained lead to the crystal grain boundaries upon aging. Heat and moisture were found to accelerate this destructive force of expansion due to the oxidation of this concentrated lead in these grain boundaries.

This research established the facts that cadmium and tin would cause similar deleterious conditions to develop and, in combination with lead, would accelerate the rate of attack and severity of total corrosion. The presence of copper was found to retard the rate of corrosion and to lessen the depth of penetration.

This work indicated that chemically pure zinc would have to be used in the manufacture of these alloys. This was an appalling conclusion because the production of large quantities of pure zinc at that time offered serious technical difficulties. These difficulties were overcome in a remarkably short period of time, however, by the development of new retort methods and the construc-



LESLIE LARRIEU

tion of new plants. Today the major part of the special high grade zinc production comes from the large electrolytic plants.

Precision Alloying

Simply stated, the high copper bearing zinc alloy is made by adding the correct amounts of pure aluminum, pure copper, and pure magnesium to a preweighed quantity of zinc so pure that it is guaranteed to be 99.99 per cent plus zinc. Unfortunately the manufacture of this alloy is not as simple as the preceding statement would indicate. In fact, the care and control which has to be exercised through all stages of manufacture definitely places it in the precision class. Morris P. Kirk and Son, Inc., have manufactured these alloys for over 18 years and the constant goal is ever toward more precise methods of manufacture and better, faster, more modern methods of analytical control.

We will trace the manufacture of the No. 2 KirkSITE through all stages necessary to convert primary metals to finished ingot alloy. We will visit the spectrographic laboratory with the control sample from this production lot and learn how this new analytical instrument functions and how the entire system of spectrographic analysis is conducted.

The Intermediate Alloy

The first step in the formulation of KirkSITE No. 2 is the production of an intermediate alloy of aluminum and copper. We do not attempt to add copper directly to zinc in the production of KirkSITE because of solution difficulties related to the high melting point of copper.

• Obtaining transmission data with Applied Laboratories Comparator-Densitometer.



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• Placing electrodes into position on Petrey spark stand, in metallurgical lab.

We make use of the phenomena of eutectics and, in the case under consideration, the eutectic composition is 33 per cent copper, 67 per cent aluminum. This fits rather closely our required intermediate alloy analysis of 40 to 42 per cent copper. The melting point of the copper addition by this method is lowered by 800° F, since the melting point of copper is 1980° F, and the melting point of the intermediate alloy is only 1050° F.

This intermediate alloy is made in large lots in reverberatory furnaces, and is agitated and mixed preliminary to

casting. The metal is cast from large ladles into special patterned molds.

Samples for chemical and spectrographic analysis are withdrawn at the time of casting and sent to the laboratory. This lot of metal is held in the aluminum alloy department until spectrographic and chemical inspection releases it for removal to the zinc alloy department.

Intermediate Alloy Added to Zinc

We are now ready to add the improved aluminum-copper alloy to molten zinc for the production of the zinc alloy. The kettles used for this operation are small cast iron kettles holding about 2700 pounds of metal, and mechanically agitated. Drossing, skimming, and casting conclude the alloying operation. All blending operations, of course, are conducted at definite and controlled temperatures, and a sample is taken from each small lot produced for spectrographic analysis.

Spectrographic Analysis

The spectrographic laboratory of Morris P. Kirk and Son, Inc., was installed some five years ago, principally for the purpose of achieving rapid and precise analyses for zinc base alloy production. Chemical methods of analysis for this alloy are tedious, time consuming, and often subject to error in the evaluation of the important impurity elements. The analytical problem, of course, is multiplied in this instance because of the large total tonnage produced which is divided into so many small production lots.

Our laboratory is exclusively equipped with instruments of Applied Research

Laboratories manufacture and includes grating spectrograph, high voltage spark source units, two comparator densitometers, film processing equipment and calculating boards.

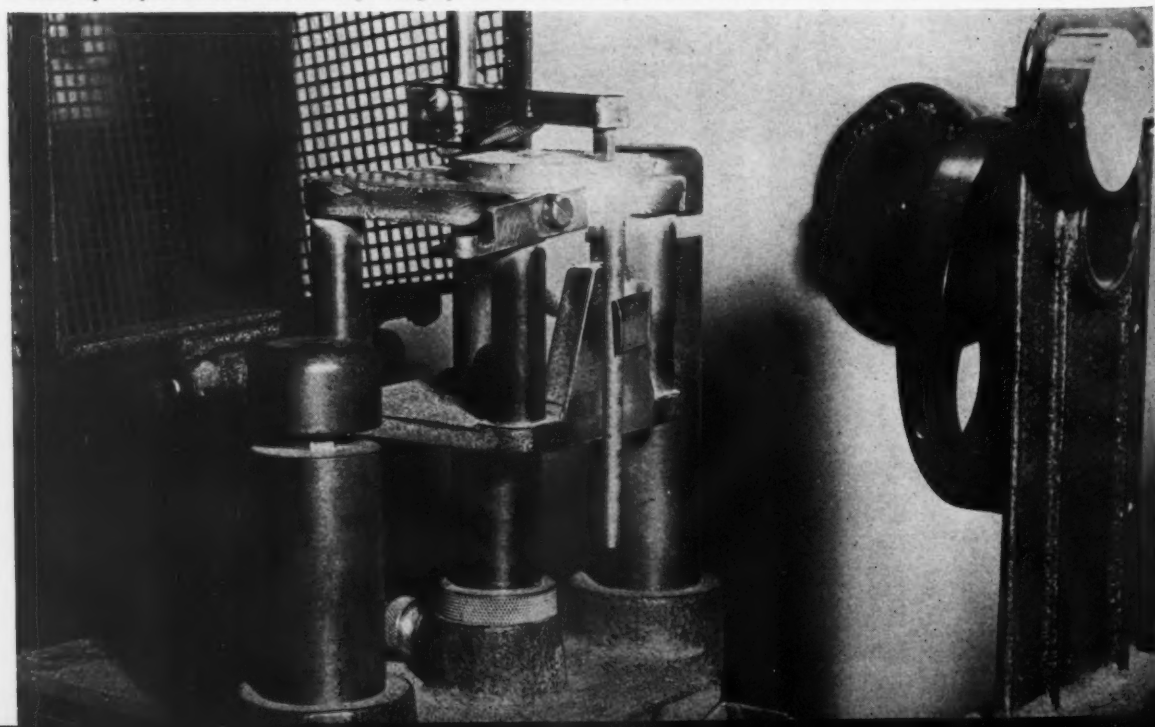
The spectrographic analysis of the Kirksite sample disc is initiated by the application of a smooth lathe machine cut to the disc surface, in order to remove surficial iron pick-up from the mold and to expose the inner more uniform metal structure. The sample disc and graphite electrode are then placed in position on the Petrey stand for spark excitation. The graphite electrode used in the analysis of these alloys introduces ammonium chloride into the discharge from its tip where the salt has been packed into a small hole drilled for that purpose. With this unique electrode, which is our own development, we are able to accurately evaluate lead at 0.002 per cent, tin at 0.002 per cent, cadmium as low as 0.005 per cent, and all the alloy constituents with one excitation on one spectrogram².

Light produced from energizing our zinc alloy sample passes through lens and slit and impinges angularly upon the concave grating. It is the function of the grating, which has 48,000 lines ruled on a 2-inch speculum surface, to disperse or separate this light into constituent spectral lines. By reflection these emission spectra are recorded on 35 mm. film held in the camera.

Films are removed from the camera under safe light in the dark room,

(2) Larrieu, Leslie, Spectrographic Analysis of Zinc Alloys. Ind. and Eng. Chemistry Analy. Edition, July 15, 1946.

• Close-up of spark excitation. With a special graphite electrode, alloy constituents can be immediately determined with accuracy.



since the camera is housed in this room. This arrangement is conducive to the rapid handling of many films each day. All films are developed under standard and reproducible conditions of time and temperature in trays held in a frame that is rocked mechanically. The wet, developed films are then dried by wrapping them around the glass cylinder of the film dryer. All films are processed in identical manner, since slight variations in time or temperature seriously affect the accuracy of the subsequent evaluations.

Densitometry and Element Evaluation

All of our work has been directed toward the attainment of this film, containing characteristically recorded spectra, since we depend upon it completely for our evaluation of alloy constituents and impurities. This record of the sample is evaluated by the two operations of densitometry and calculation of densitometric data in accordance with the "Internal Standard Method" of Spectrochemical Analysis³.

Densitometry is the measurement of the diminished light that is transmitted through the spectral line. We measure each element spectral line for which we are seeking a quantitative evaluation

(3) Brode, Wallace R.—Chemical Spectroscopy. John Wiley & Son, 2nd Ed. 1943.

plus a spectral line for the base element which, in this instance, is zinc. We do this for the unknown sample disc and for a known standard, which has been registered on the same film with the unknown sample.

A small slit 0.0005-in. in width attached to the tube, which in turn is motor driven, scans over the line desired and transmits the light to a photocell connected by bridge circuit to a galvanometer. 100 is taken as full transmission through clear film, and the readings obtained represent that amount of diminished light transmission or line darkening.

Calculations consist of correcting each transmission to relative density by the use of a film calibration curve. This calibration curve is essentially an expression of the film emulsion's functional ability to record line blackening in the spectral wave length region, in which we are interested. Now with these original transmissions and conversions to densities, we can obtain ratios between element lines and internal standard line, which in this case is zinc, and from these intensity ratios proceed to working curves and obtain percentages. These working curves, of course, have been previously constructed from data derived by spectrographic

analyses in similar manner on known composition standards.

Percentages are plotted vertically and intensity ratios are plotted horizontally on log paper and lines drawn through established points produce working curves which will give percentages for all intensity ratios covered by their limits.

This, then, is the method of spectrographic analysis used to control the production of the various "Kirksite" alloys in the Morris P. Kirk and Son smelter. It is accurate, rapid, and gives a complete answer as to composition and impurity content for each small production lot of metal.

Summary

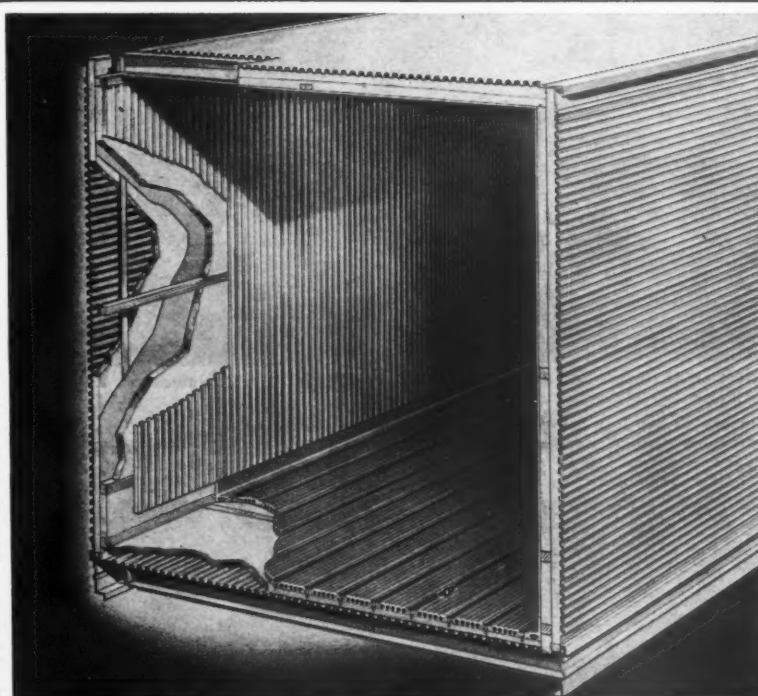
The salient and characteristic features of the zinc base alloys have been presented necessarily with some brevity. These alloys have been considered as relatively new alloys and certainly as products of successful research. The destructive force of intergranular subsurface corrosion has been emphasized as ample justification, indeed, even necessity for all the care exercised in the manufacture and precision employed in the analytical control of these alloys. The details of the spectrographic method employed has been omitted since the complete method can be consulted from the references listed.

Magnesium Utilized For Trailer Floors

Considerable saving in weight has been effected by Fruehauf Trailer Company through what is believed to be the first use of magnesium for flooring in commercial trailers built at their Los Angeles plant.

Through the use of the magnesium floor instead of the ordinary "wet type" refrigerator van floor with duct boards is 23½ pounds per running foot of trailer. Even should duct boards not be required with the conventional type floor, the magnesium floor saves about six pounds per running foot. For dry freight vans, the magnesium construction saves approximately 17½ pounds per running foot. It is slightly more than 10 pounds lighter per running foot of trailer than the customary composite floor.

According to Fruehauf engineers, a 35-foot stainless steel refrigerated van with gravity tandem axles now is manufactured at a reduction in weight of approximately 1100 pounds from that of former similar models. This, they say, is accomplished with no sacrifice of strength or safety.

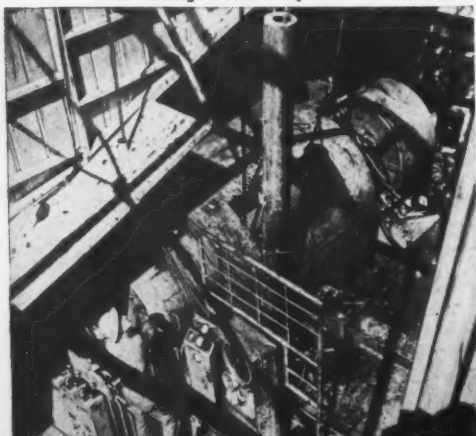


Using the tongue and groove method, trailer-length magnesium I-beams are grouped to form "boards" for flooring. In refrigerated trailers, as shown, a "keeper" is used between the "boards" to lock them to the cross sills by means of countersunk screws. A cross section of the floor and sides visualizes the use of Fiberglass insulation.



• Derrick at record-breaking wildcat well, Pacific No. 1, in southwestern Wyoming.

• In one of the last round trips of this venture, a drilling member "tongs up" a section of drill pipe as the string is being hauled up to the surface.



• Drillers position and drawworks of Ideal Type 160 Rig at Pacific Creek No. 1. Control panels engineered for positive control over all operations.



Tapping the Deep Reserves

This giant National Supply drilling rig, operated by Superior Oil Co., is credited with digging the deepest hole on the face of this earth, at a wildcat location near Rock Springs in southwestern Wyoming.

Two items of significance stand out in this record depth (20,521 feet) achieved by the four crews who worked throughout the winter on a round-the-clock basis. First, the record was established under the most trying conditions experienced during the worst winter Wyoming can recall. Second, the huge drilling equipment proved that it was possible to drill down to depths for which it was scientifically designed and engineered.

Such an accomplishment underscores the search for prospective petroleum reserves that geologists predict may lie at hitherto unattainable depths.

This National Ideal Type 160 Consolidated Rig was used here for the first time anywhere. Its power plant consists of three Superior supercharged dual-fuel diesel drilling engines with a combined capacity of 2010 horsepower. Output of these engines can be delivered to the two pumps, an ideal E-700 and an Ideal C-350, whose input horsepower is rated at 825 and 495 respectively.

At the same time, engine output can be used to drive the rotary table, or, when hoisting, the entire power can be delivered to the drawworks.

Another new engineering development used here is the Ideal Gyrol Fluid Drive. This is a coupling mounted adjacent to each engine, on the engine extension shaft. Drive from engine to drawwork or pump passes through these couplings, and by varying engine speed and the slip of the coupling, a wide power and speed range is available.

Several times during this period, torque built up in the string, and every time the coupling slipped completely, thereby stalling the table and eliminating the danger of twistoff.

The rig's crown block is rated at 630 tons, and the 11-ton six-sheave travel-block at 540 tons. These blocks are the largest ever used on a drilling rig, and when strung with a 1½ inch wire line, they constitute the heaviest hoisting equipment ever constructed for any purpose.

Despite the size of the line, it was reported from the well site that the 1½ inch wire line spools as easily and with just as much freedom as smaller diameter lines or lighter rigs.

Reduce Risks and Losses with Metallurgical Insurance

By T. H. GRAY
Consulting Metallurgical Engineer
Metallurgical Engineers, Inc.
Portland, Oregon

ANALYSIS of many types of metal failures on the West Coast is convincing industry of the need for the greater extension of metallurgical insurance by industry and an increased application of metallurgical fundamentals by the insuring agencies. The purpose of this discussion is to illustrate and amplify the purpose of metallurgical insurance and to indicate how competent metallurgical personnel can help both industry and the insurance companies to reduce their risks and losses.

What is metallurgical insurance? At first thought there appears to be no special relationship between the field of metallurgy and the business of insurance. A more thorough reflection, however, reveals the very real interdependence that exists between metallurgy and many segments of the insurance

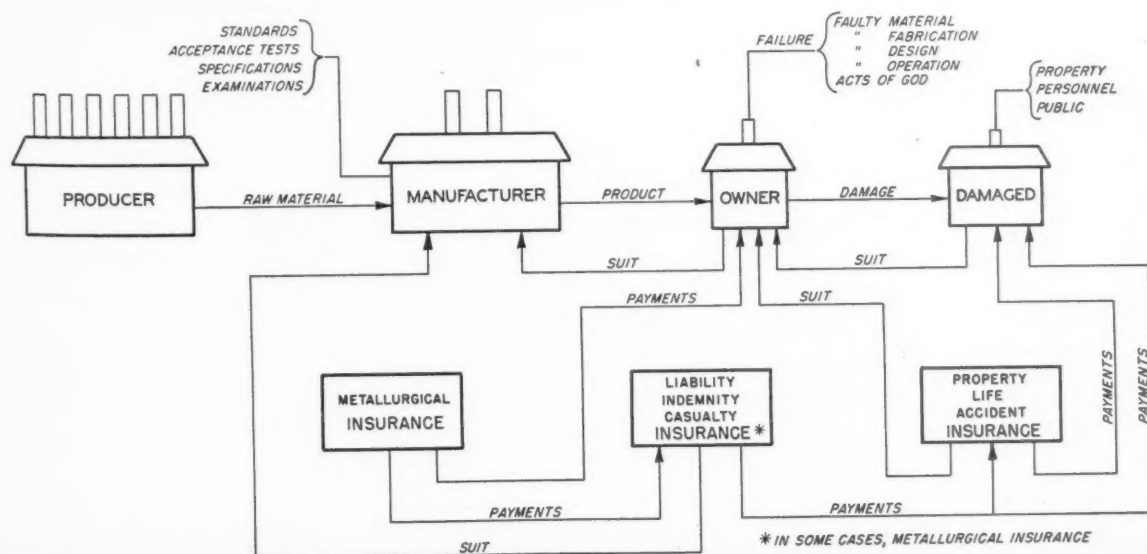
field. It is understandable that this is so because of the intimate association between the innumerable metal machines, tools, and structures, and the machinery-minded inhabitants of the Western United States.

Metallurgical insurance (from the insurance point of view, indemnity or liability insurance on metal machines and structures) is insurance placed on metallic products by manufacturers and contractors to cover their liabilities in case of failure of these products. Another way to describe metallurgical insurance is by defining what it is not; for example, the ordinary automobile insurance on a person's car, though it is on a metallic product, is not metal-

lurgical insurance. If an accident occurs as a result of a failure of a defective part, the operator of the car is held to be liable for the damages incurred, not the manufacturer of the defective part. In turn, however, the operator may bring suit against the manufacturer, who may have insurance coverage on his product against failure, or the consequences of failure. This latter insurance coverage would properly be termed metallurgical insurance since it is directly concerned with the performance of the metallurgical product.

A diagrammatic illustration of the place of metallurgical insurance is given in the accompanying chart. Various ramifications occurring upon failure of a product, such as sources of suits and payments of claims, are indicated.

(Continued on page 56)



* IN SOME CASES, METALLURGICAL INSURANCE

METALLURGICAL INSURANCE

(Continued from page 55)

Incomprehension of some industrial concerns of the need for metallurgical insurance has been rudely exposed by damage suits, which in extreme cases have proven costly and ruinous to the concerns involved.

A poorly designed pressure tank, a misapplication of a spot-welded vessel, a failure of a defective weld, the use of inferior metals, neglect of the factor of safety, ignorance of fatigue life of metal parts—all have many times proven so costly in lives and property damage that it appears self-evident that insurance coverage of metal products should be one of the first considerations in efficient management.

Many progressive manufacturers have transferred this risk to the insurance companies to remove one of the many uncertainties from their operations.

Consequences of neglect of some phases of metallurgical insurance are often brought into the consultant's realm of experience. A simple, striking example has well illustrated this point to the writer. A company had been fabricating container vessels or tanks for a number of years without taking the precaution of insuring itself against the liabilities which may arise from the occurrence of vessel failures. This company recommended an application of one of its vessels for a new use to which the vessel was unsuited. The vessel exploded, killing the operating crew. Payment of the resulting claims bankrupted the company.

Insurance Viewpoint of Metallurgy

This incomprehension of metallurgical insurance is matched by the lack of understanding of many insurance companies of the technological aspects of the insurance that they issue on metal

products. In other branches of insurance, for example, life insurance, companies are very cognizant of factors that increase or decrease their risks. They are constantly increasing their cooperation with the medical profession in reducing the occasion of sickness and disease for the purpose of increasing longevity to their insured.

Fire insurance companies have been instrumental in setting up the National Board of Fire Underwriters and the Underwriter Laboratories, and in promulgating electrical, building, and heating codes for decreasing the occasion and severity of fires, and consequently their own risks.

In the field of metallurgical insurance, although insurance companies have accomplished much in some directions, notably in the boiler and pressure tank industry and in elevator construction, they have accomplished very little in other directions. It is a moot question as to how much regulation and inspection should be undertaken, and often insurance companies, or groups of companies, have acted as their own guide in this respect, occasionally to their own detriment.

The standards, codes, and specifications that cover metallic products, such as the A.S.T.M.¹ Standards, the welding specifications of A.W.S.,² the A.S.M.E.³ Code, and others, have been initiated by manufacturers and users of metallic products, with occasional slight cooperation by insurance companies in particular products and applications.

In other applications or products, where implications of failures are not so obvious, insurance companies have

1. A.S.T.M.—American Society for Testing Materials.
2. A.W.S.—American Welding Society.
3. A.S.M.E.—American Society of Mechanical Engineers.



T. H. GRAY

done practically nothing except to check the experience of the manufacturer, his reputation, and his history or lack of history of prior suits and claims before issuing policies.

Occasionally the insuring agency assumes the risk of insuring metal products without understanding the hazards involved in design, manufacture, and use of the insured product.

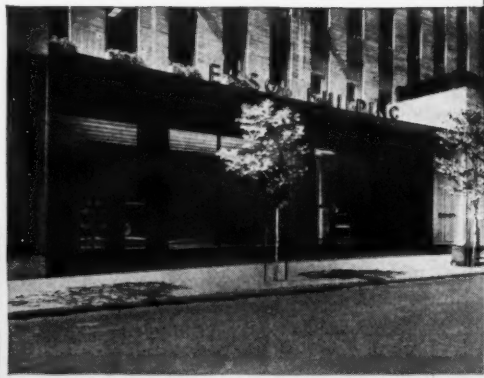
A serious failure of an insured, welded, stainless steel container that cost the lives of two of its operating personnel has been a vivid example in the writer's experience. Failure resulted because a solution heat-treatment was not applied after welding to remove carbide precipitation.

Employment of personnel with thorough knowledge of the metallurgical

(Continued on Page 58)



* Twisted wreckage of the Washougal River bridge, on U. S. Highway 830 near Washougal, Washington. This disaster is a result of an accident involving two oil trucks, and resulting fire.



bronze magic

● A striking effect of spaciousness and beauty was achieved in the lobby of the new Esso Building at Rockefeller Center by continuity of line and material from indoors to outdoors.

Along the entire length of the two-story lobby the walls are faced with large panels of Architectural Bronze. These walls continue, in an unbroken line, past the glass entrance walls to form a part of the bronze frame around the entrance. Thus indoor and outdoor areas seem to merge into a vast hall, penetrated only by the banks of elevators in its center.

Architectural Bronze panels provided the ideal material for this unusual installation because of their suitability for use indoors or outdoors. In addition, they will facilitate any future alterations which might require changes in the location of the doors along the lobby walls. And, of course, Architectural Bronze with its warm golden color, fits into the overall architectural pattern of Rockefeller Center, where

this metal is used generously on all of the buildings.

Revere Copper and Brass Incorporated supplied these bronze panels—more than 70,000 pounds in sizes up to 48" x 114", all 10 gauge. Architects: Carson and Lundin, New York. General Contractor: John W. Harris Associates, Inc. Ornamental Metal Contractor: General Bronze Corporation, New York.

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(Continued from Page 56)

problems involved in the manufacture of metal products, imposition of specifications, and added inspections of products by the insurance companies will be economically justified by the decrease in failures and claims in many industries. There is good justification for closer cooperation that should exist between the insurance field and the science of metallurgy.

Another case in the writer's experience illustrates occasional foresight of insurance agencies in handling of metallurgical claims. A fire had damaged a large stock of formvar copper

wire coils, covered by inventory insurance, in the warehouse of a large Western manufacturer. The manufacturer rejected the wire coils as being damaged and requested that the insurance company settle the claim in full.

Metallurgical investigation showed that only the outer layers of the coils were damaged and that a simple operation could be instituted to salvage the coils. A prospective almost total loss to the insurance company was reduced to a less-than-10-percent damage claim.

The procedure of this insurance company which settled the claims incurred

as a result of a sawmill boiler explosion without recourse to metallurgical investigation. The latter case could have served as an example of the converse relationship that may exist between different branches of insurance and metallurgical science, indicated in the chart, wherein one insurance company may employ metallurgists to reduce its risk by improving the insured product, and another insurance company may employ metallurgists to attempt to show that the product insured was responsible for the damages inflicted upon its clients.

Although as yet insurance companies are somewhat lax in the use of technical assistance in reducing their metallurgical risks, they are becoming increasingly cognizant of the help offered by metallurgists in settlement of damages caused by metal failures, much to the dismay of many manufacturers and agencies that provide metallurgical insurance coverage.

Application of Metallurgical Insurance

Insurance on metallurgical products has been employed mainly by fabricators of metal pressure vessels, such as boilers, gas tanks, and standpipes; by contractors and builders of bridges, vessels, buildings, and dams; and by some manufacturers and users of metal machines where failure would prove costly to the operators or endanger the lives and property surrounding the machines.

Typical applications of metallurgical insurance and the results of such insurance are briefly described in the following sections.

A. Applications to Structures

There are generally two types of metallurgical insurance placed on metal structures—one, a direct liability insurance, covers the liabilities that result from failures occurring during construction and is terminated by completion of the structure and its acceptance. The other type of insurance is generally termed "products liability insurance" and covers liabilities arising from use of the structure after completion and in service elsewhere than on the premises of the manufacturer or builder.

There is little metallurgical supervision given by insurance companies to many types of structures, such as buildings or bridges, the issuance of the policy being governed by the reputation of the builder, the architect, and the engineer. Supervision is normally made by the purchaser, his agent, or the architect.

Other types of structures are rigidly supervised by insurance companies,



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either by themselves or with the cooperation of governmental agencies and professional engineering societies. Such structures include pressure tanks, boilers, and elevators.

Anyone may construct boilers or other types of pressure vessels; but before these vessels can be placed into service, an operating permit must usually be obtained from some governmental agency, generally the state. Before the state will grant this permit, it will normally require that the vessel be stamped with the approval of the National Board of Boiler and Pressure Vessel Inspectors, a non-profit organization consisting of the voluntary membership of the chief inspectors or other officials charged with the enforcement of boiler and pressure vessel inspection regulations of any political sub-division of the United States or Canada that adopted the boiler construction code of A.S.S.E.

In order to obtain the approval of this body, the manufacturer must fabricate his vessel in accordance with A.S.M.E.-A.P.I.⁴ Codes regulating the construction of pressure vessels, which include raw material specifications, inspection of fabrication procedures, acceptance tests on completed vessels, and final approval by an authorized inspector.

Periodic pressure vessel inspections by a qualified inspector employed by the state are usually required on the vessels in service.

Under conditions surrounding construction of pressure vessels and elevators, risks assumed by the insurance companies are held to a minimum. Occasional failures still occur, however. The comparatively recent spectacular destruction of the Tacoma Narrows Bridge, the explosion of the Cleveland gas tank, and the break-up of the tanker Schenectady—all give eloquent testimony to the ever-present possibility of failure.

Results of these and other failures have been salutary in some respects. Governmental and insurance agencies, in particular, have learned more concerning metallurgical requirements; the many specifications, restrictions, and codes now applied attest to lessons so hardly learned. Employment of inspection personnel is becoming standard practice, as witness boiler and elevator inspections, but it should be remembered that there is a limit to the metallurgical "know-how" of these inspectors.

Metals employed in the erection of many buildings, bridges, vessels, tanks, and similar structures, in an increasing number of instances, are required to

4. A.P.I.—American Petroleum Institute.

(Continued on Page 60)

September, 1949—WESTERN INDUSTRY

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(Continued from Page 59)
meet rigid specifications of strength, ductility, and toughness, not only at ordinary temperatures, but also at temperatures greatly in excess of ordinary temperatures, both hot and cold. Metallurgists are aware of properties of metals under these conditions but how many manufacturers and insurance companies are aware of specifications of metals at -300°F. , for example? New standards and tests are being required because the present tests do not always cover every mode of stress encountered in service, and failures still occur.

More thought should be given to fatigue strength of metals in actual struc-

tures. Many structures normally stressed well below the maximum strength of the steel members comprising the structure have failed when subjected to repeated loads. Fatigue strength and fatigue life of metals are still unfamiliar terms to many manufacturers, builders, and insurance companies.

Occurrence of fatigue failure is one of the most common causes of structural failure. Elevators and lifts, because of their repetitious type of operation, are particularly susceptible to this type of failure. An example of elevator failure due to fatigue was recently examined where fatigue cracks had initiated themselves at points of stress concentra-

tion around rivet holes in a structural member, and ultimately caused failure of the structural member and damage to the elevator and accompanying personnel.

A metallurgical examination of the break revealed a fracture texture characteristic of fatigue failure resulting from faulty design that had, in the first place, provided locals for stress concentrations, and, in the second place, shielded the localities from inspection by the closeness of adjoining members and gusset plates.

B. Applications of Machine Insurance

Of increasing importance to industry in general is the applications of insurance against losses incurred by breakdown of metal machines in a continuously operating plant. There are two parts to this type of insurance:

1. Inspection. An initial inspection is made of the type, design, and condition of the machine, followed by periodic inspections by the insuring agency.

2. Coverage against liabilities arising from failure of the machine. These liabilities include losses resulting from shut-down of operations, as well as from damage to the insured and property and bodily damage to others caused by machine failure.

Most machinery insurance requires that the insuring companies provide immediate engineering and repair services to the policy holders in order that shut-down periods and cost to the insurance companies be held to a minimum. Result of this type of service has been to reduce manufacturing losses resulting from break-downs, but in so doing, the manufacturer has lost some control over selection and operation of his insured machinery. It also requires increased cooperation between the purchasing agent and insurance company.

An added result of the expansion of this type of policy has been the opening of another sphere of activity for the engineer. A large number of engineers are now employed by the more alert industrial insurance agencies.

A summary of the highlights of an actual, general machinery type of insurance policy issued by a leading West Coast industrial insurance company is illustrative of this type of insurance. Policy provisions consist of the following:

1. Payment to the insured for loss on the property of the assured directly damaged by such an accident, or if so elected, repair or replacement of the damaged property.

2. Coverage or protection against liabilities in regard to damages to other property.

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3. Protection against liabilities for injury to the general public.

4. Payment of legal expenses and costs taxed against the assured in any legal proceedings defended by the insuring company.

5. Protection against loss of production on the premises resulting from accident to the insured machinery.

6. Protection against spoilage losses resulting from accident to the insured machinery.

Other provisions against contingencies not mentioned may be added. Personnel damages must come under some other type of insurance policy.

Long-Range Implications

Metal suppliers and foundries, for example, occasionally chafed by governmental specifications and still raw from war-born standards, have longed for the good old days of no specifications except for size, weight, and material. In the shortage of wrought metals and castings after the war, they had obtained a breathing spell as a result of their ability to pick and choose their customers, who usually accepted gratefully whatever they could get.

This picture is fast changing. Already many foundries are down and metal supplies are plentiful. It is the customer who now picks and chooses. His choosing is becoming guided somewhat by the cost of metallurgical insurance, as well as by the desire to produce better products. Specifications are being added, not reduced. The trend is illustrated by the increasing imposition of hardenability specifications in the purchase of steel, in addition to the chemical and physical requirements now familiar. Wider application of acceptance tests is in the cards.

Manufacturers of metallic products, the failures of which endanger property and lives, are requiring closer metallurgical supervision of their products. Frequent field breakdowns of insured equipment have been responsible for much development work in new processes, materials, and design in the past and will have a greater effect in the future. All of this adds up to a general tightening of specifications, addition of metallurgical controls, more research and development work, elimination of marginal manufacturers and contractors, and production of superior machines, tools, and structures.

Some control in the selection of his machinery is being lost by the manufacturer to the insuring agency, and a greater use will be made by the insurance agency of engineers and metallurgists for regulation of insured products.

Field of the Consultant

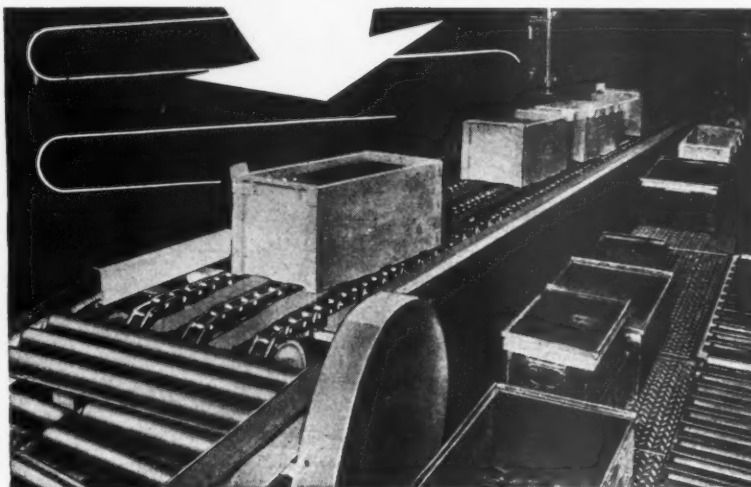
Increase in product requirements indicates that applications of sound metallurgical techniques are becoming a greater necessity for production of good metal products, as well as for determining whether the products are good insurance risks. Often the size and volume of the business does not warrant full-time employment of a metallurgist. The consulting metallurgist, particularly in the east and mid-west, employed on either a retainer or straight job basis, has supplied the limited met-

allurgical needs of small businesses in an inexpensive fashion.

For insurance companies covering metal products and structures, employment of qualified metallurgists for examination of products before placing them in the field of calculated risks is as logical as the action of life insurance companies in requiring a thorough physical examination of the applicant by a duly qualified physician before accepting a life insurance application. Metallurgical counsel after failure has occurred has become even more of a neces-

(Continued on Page 62)

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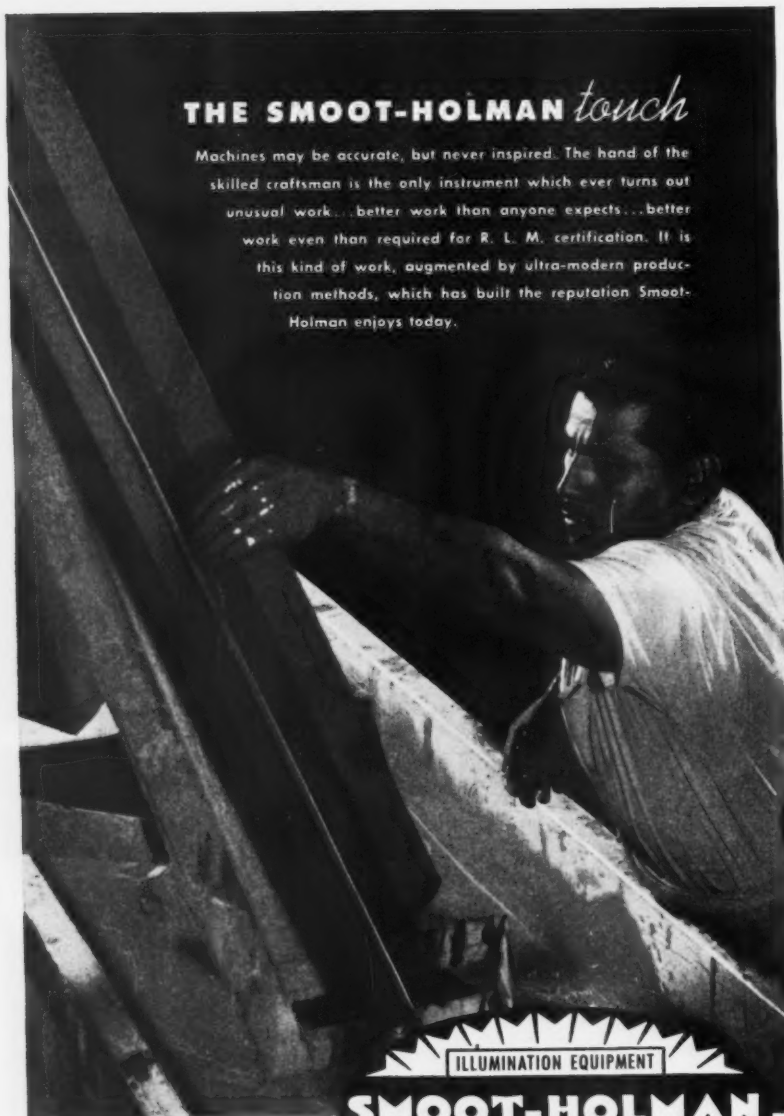
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(Continued from Page 61)

sity because of the financial implications of damage suits.

Conversely, manufacturers and insurance companies under suit as a result of damages caused by failure of metal products are to a greater extent finding themselves arrayed against expert metallurgical counsel. Companies insuring life and property damaged by metallurgical failures are finding it advantageous to employ independent metallurgical consultants to determine the exact cause and responsibility of metal failures.

Role of Purchasing Agent

The two crucial roles in reducing risks incurred by product failures and, consequently, cost of metallurgical insurance, are played by the engineering staff, including the metallurgists, and the purchasing agent of the manufacturer and contractor. The place of the engineering staff with respect to its responsibility for specifications and design is generally well understood. The position of the purchasing agent in this picture is not so clear.

It is the purchasing agent's responsibility to see that the purchased metal supplies are of sufficient quality to fulfill adequately the design requirements of the product. It is his duty to impose specifications on the company's suppliers and to see that they are being met by physical and chemical tests on the purchased material, if necessary.

This often requires close cooperation with the engineering staff, in particular the metallurgist. If no company metallurgist is available, cooperation with independent metallurgical laboratories in the performance of examinations and acceptance tests is usually feasible.

In any event, the increasing cost of metallurgical failures imposes a heavier burden on the purchasing agent, which can be lightened by the addition of metallurgical counsel and control.

Conclusion

The series of consequences of metal failures and resultant losses to the manufacturer and to the insurance company providing metallurgical insurance can be materially reduced by effective teamwork of manufacturers, insurance companies, and metallurgists, both as independent consultants and in the employ of the manufacturer and insurance companies. It remains for the metallurgists to explain their functions and capabilities to the insurance and manufacturing companies and for the latter to understand and make use of the metallurgists, in order that the desired goal of minimum cost and property damage and maximum safety be attained in the use of metal products.

Bombs Away

All the shells, bombs, and other high explosives manufactured for use in World War II were not used. Many of them are still with us, and still potentially dangerous. Thousands of tons of them have been brought back to this country from all theatres of war operation.

Some of these missiles were too deteriorated to be handled safely, and were destroyed. But now the army has found that the disassembly of this ammunition is not only practical but is exceedingly profitable to the government; so profitable, in fact, that construction of a special ammunition disassembly plant has been authorized, to be built on the West coast.

Cost to the government is estimated at approximately \$100,000. The plant will be located in an outlying corner of the Umatilla Ordnance Depot reservation, near Ordnance, Oregon, and completely isolated.

Ammunition ranging from shells and bombs to block busters will be handled there. Actual disassembly operations will be handled remotely from behind heavily armored barricades, with the operator using a television camera to see what he is doing, disarming the weapons remotely by electrically-operated wrenches.

After the shells and bombs have been disarmed, all parts will be cleaned and inspected. If found to be in good working condition, the missile will be reloaded, painted, and stored. If the shell or bomb is not considered satisfactory for re-use, the powder and all material will be reclaimed. Through the use of live steam, all powder will be processed and the resulting TNT concentrate packaged and stored.

Zinc—A Modern Metal

Zinc, as a pure metal, was probably not known in Europe until the Sixteenth Century, although Chinese metallurgists may have isolated it several hundred years earlier. Previously, it had appeared only as an alloy or impurity. Extraction from ores by distillation was not introduced into Europe from the Far East until late in the Eighteenth Century.

Wide potential application of the metal really stems from the discovery that by heating zinc to between 100° and 150° C it could be rolled into sheets. This process was patented in 1805 by Hobson and Sylvester of Sheffield, England. Introduction of the galvanizing process came some time in the 1830's.

By 1939, U. S. zinc consumption was distributed approximately as follows: galvanizing, 44 per cent; brass making, 28 per cent; die casting, 13 per cent; sheet zinc, 10 per cent; other uses 5 per cent.

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It's good business to use these extra tough screws—for speed in the shop and strength in your finished product. You get the best that money can buy at only a slight increase over the cost of 1020 bright screws. Cleveland High Carbon Heat Treated Cap Screws are made by the Kaufman *Double Extrusion Process*—a method that assures you *extra* strong fasteners with *extra* close tolerance forming. Complete range of sizes from ¼ to 1½ inch diameter. It pays you to specify and buy Cleveland High Carbon Heat Treated Cap Screws.

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LABOR

and the
INDUSTRIAL WEST

Further Break in Established Rates

By Western Industry's
Labor Relations Analyst

A FURTHER break, in what, a few months ago, were considered well established wage scales over the country is reflected in the report of the Bureau of Labor Statistics for June.

Metal working industries, from the detail of number of companies, the number of companies granting no wage increases in renewing agreements and those granting some wage increases, led all the others in the number not granting increases; and this condition applied all over the country.

Some 155 agreements in the manufacturing and miscellaneous manufacturing classifications were reported on, a number of these covering associations of employers, making the approximate total of employers involved some 440 to 460, (some of the detail on groups of employers was not given; also some of the detail of numbers employed); however, according to the report, this group employs around 110,000 people in various parts of the United States.

Of these 155 contracts renewed, 84 granted no wage increase, 69 gave some wage increase and two negotiated wage reductions. A number of those granting no wage increase granted bonuses, on annual earnings of the employer, on monthly sales, bonus on production, or flat wage bonus; some agreed to wait until other deals, such as steel, were settled and there were many changes, favorable to employees, in vacations, added holidays and so on.

The U. S. Time Corporation, Waterbury, Conn., during May negotiated a wage decrease of 21 cents per hour and discontinuation of 7 paid holidays. Some 200 are employed. The New Haven Clock & Watch Company, New Haven, Conn., employing 850, also in May, negotiated a reduction of 10 per cent in incentive pay rates. This decrease, according to the report of the Bureau, is to be restored at the end of the current year, together with a 5 per cent increase if the company shows a

profit by that time; if it does not the matter of wages will go to arbitration.

The wage increases of 66 of the 69 were divided as follows:

	Employers
Less than 5 cents per hour.....	10
5 cents per hour.....	32
5 to 10 cents per hour.....	24
	66

One left out was listed as increasing pay 6 cents per day; and a 4½ per cent incentive. Another had revised classifications entirely which resulted in a 27-cent average increase.

Food and Kindred Industries—Out of 1,000 employers reported on in this classification, which includes bakers, breweries, canneries, dairies, and so on, four, three groups and one individual employer were listed as giving no wage increase.

Textile Mill Products—Fifteen employers, one with six plants, were covered in this report. One employing 300 people in Georgia, reduced wages 12

per cent. One, with 5,000 employees and the six plants, rescinded a former decrease of 8 per cent. One in Chicago with 650 employees, increased wages 5 cents per hour; another, a felt mill, at Burlington, Wis., raised the rates of pay 9 cents per hour. The others, employing some 16,250 did not raise wages.

Apparel—Two reports in this classification: One manufacturer at Norwalk, Conn., 200 employees, got a decrease of 16 per cent in piece rates and 10 per cent in hourly rates; the other covered 27 clothing manufacturers in Cincinnati Ohio, with 6,000 workers, who renewed their contract for three years without a wage increase or decrease.

Lumber and Furniture—Mostly associations representing millwork, cabinet makers, and furniture establishments in the east and midwest, these split 7 to 7 on wage increases. The highest increase was 10 cents per hour, the lowest 4 cents, both by associations.

Paper and Allied Industries—Last month we reported that some 26,000 workers in this classification had ac-

(Continued on Page 66)

TIME TO FACE THE FACTS INTELLIGENTLY

From the accompanying detailed analysis of the latest report of the Bureau of Labor Statistics, it is plain that the long period of stabilizing wages at the highest possible level, by the unions and the government, is passing. Slowing down in buying, in many lines—the textile industry is a good example—has brought employer resistance to further wage increases.

This is reflected in the past three months' reports. In these the percentage of those companies not increasing wages, but renewing contracts, to the total within their own reported group, is growing rapidly. The law of supply and demand, cancelled by government buying before, during and after the war, is again beginning to control. Stiffer competition, a condition practically unknown now to many young executives and to most union people, will bring many headaches to both.

Now seems an ideal time for employers to call in representatives of their unions and in friendly ways give them the facts about the local situations. Many foresighted managers have done this already. That would seem to be the first step in the direction of promoting the kind of human understanding most likely to result in additional production per man hour.

GENERAL WAGE CHANGES IN PACIFIC - ROCKY MOUNTAIN REGION

NOTE: This tabulation only reports changes. Information on the large number of contracts renewed without change is unavailable. Therefore the tabulation should not be construed as an indication of the overall trend.

Compiled from various sources by Bureau of Labor Statistics, Wage Analysis Branch
(Where initials of unions are given below: A=A F of L; C=CIO; I=Independent)

CALIFORNIA	Location	Date	Amount of Increase	Number of Workers	Other economic Benefits
Food Processing					
Calif. Processors & Grow. Assn. (75 canneries)	California	6/49	None	TCWH—A 60,000	6 pd. hol. for regulars and some seasonal wkrs.; "Standby time" subject to ratification
S & W Fine Foods (cannery)	Redwood City	4/1/49	5 cents	TCWH—A—400	
Dairies, drivers, plants	Sacramento	5/49	10c men; 5c wom.	TCWH—A	
5 Wholesale bakeries	San Diego	5/1/49	9 cents	BCW—A	
Calif. Bev. Bottlers Distillers	Los Angeles	6/1/49	5 cents	TCWH—A—250	Add. 5c 11/1/49
Calif. Brewers Institute	San Francisco	4/1/49	7½ cents	TCWH—A	Inc. from double to 2½ times for holidays
Leather Products					
Armored Trunk Co.	Los Angeles	6/28/49	5-10 cents	FLW—C—68	6 pd. hol., 2 wks. vaca. after 3 years
OREGON					
Food Processing					
Master Bakers Assn.	Portland	6/28/49	10 cents	IUOE—A—21	
Transportation					
Hauling & Dray. industry	Portland	5/49	5 cents	TCWH—A—950	
Chemicals, Allied Products					
Mt. Hood Soap Co.	Portland	6/17/49	6 cents	ICW—A	6 paid holidays
Public Utilities					
Mountain States Power Co.	Albany	6/20/49	15 cents	IUOE—A—17	
WASHINGTON					
Mfg., Metalworking					
8 Independent mach. shops	Tacoma	5/6	None	IAM—I—65	1 add. paid holiday (total 7)
Amadon Forge & Mach. Works	Longview - Kelso	5/6	None	IAM—I—20	1 add. paid holiday (total 7)
Kelso Wld. & Mach. Works	Longview - Kelso	5/6	None	IAM—I—20	1 add. paid holiday (total 7)
9 Machine shops	Bellingham	5/23	None	IAM—I—55	1 add. paid holiday (total 7)
Wash. Metal Trades Assn.	Seattle and N.W. Washington		None	IMFW—A—1600	1 add. paid holiday (total 7); add. vaca. benefits
COLORADO					
Metal Working					
Wm. Ainsworth & Sons, Inc.	Denver	5/49	5 cents	USA—C—75	
U. S. Foundries, Inc.	Denver	retro. 4/15/49	none	160	
Nat'l Lead Co.	Denver	retro. 4/15/49	none	95	
Transportation					
Denver Tramway Corp.	Denver	5/1/49	5 cents	SERMCE—A—900	Add. 4c eff. 11/1/49
Food Processing					
Walter Brewing Co.	Pueblo	5/14/49	7-10 cents	BFCSD—C—40	
IDAHO					
Clay, Glass, Stone Products					
Idaho Firebrick & Clay Co.	Troy	6/24/49	5 cents	UBCW—A—16	
Transportation					
8 Freight long lines	Utah and Idaho	5/1/49	7-10 cents	TCWH—A—700	Add. 2½c eff. 11/1/49 for drivers (to 12½c)
Public Utilities					
2 Electric companies	Boise	6/6/49	15 cents	IBEW—A—100	Constru. & maint. wkrs.
MONTANA					
Food Processing					
Sicks Brewery	Great Falls	6/27/49	15 cents	BFCSD—C—15	
Transportation					
Silver Bow Empl. Council	Butte	6/49	none	TCWH—A—600	Drivers, 6 pd. holidays; 1 wk. vacation
ARIZONA					
Food Processing					
12 Bakeries	Phoenix	5/26/49	5 cents	BCW—A—250	

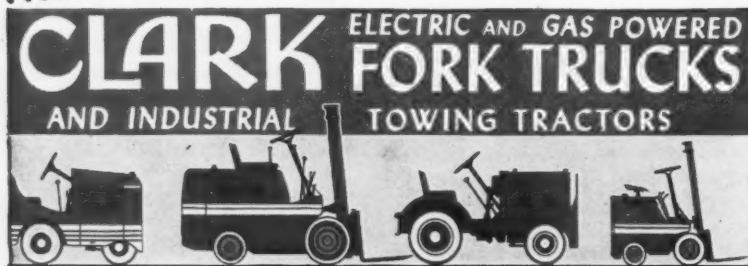
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(Continued from Page 64)

cepted renewal of contracts, for a period at least without wage changes. This month the Bureau's report shows 15 paper and allied industry plants, one of which employing 600 people increased wages 3 cents per hour. The 14 reported contracts revised without wage changes. Total employment for the group would be around 5,000 people.

Printing and Publishing—Of 33 bargaining units, mostly associations of commercial printers or groups of newspapers, two—The World Telegram, New York, and Commercial Printers, Portland, Ore., did not grant some increase, in extending contracts. All the others did.

Chemicals and Allied Products—A total of 39 companies were reported on, and seven reported contracts renewed without general wage changes. Increases reported ranged from 3 cents to 12 cents an hour with 11 at 5 cents in the cases of 32 units.

Petroleum—Seven major companies increased rates of pay, according to this report, 14, 13, 12, 5, 5, 5, and 3 cents per hour, respectively. Six of these showed a combined employment of 8,600 affected employees.

Rubber—Of six large companies, five of whom employed 3,350 people, four renewed contracts without wage changes; two settled, one for 6 cents on piece work and 5 cents hourly on day rate; and, the other 3 and 5 cents. This last, the report states, "Approximately 100" (of 250 employees) "received no increases."

Leather and Leather Products—Ten bargaining units, one with 10,000 people, with a total employment of 14,875, divided, four with the majority of employees, no wage change and six with increases ranging from 4 cents to 5½ cents per hour. All in east. In middle west two other companies gave 5 cents.

Stone, Clay and Glass Products—With total employment of 9,750, 14 bargaining groups, including factories, glass setters and cement plants, representing some 9 units, divided, two companies, no wage increase and 7 with increases ranging from 5 cents to 7 cents per hour. The two employed 4,700 of the people.

Warehousing, Wholesale and Retail Trade—Thirty-seven bargaining units, with 16,000 employees reported and a considerable number not given. Four of these, three of whom had 1,450 employees, got renewals without wage changes. Two cents per hour was the lowest reported for 21 produce companies at Indianapolis and 17½ for retail stores in Cheyenne, Wyoming.

Five Keys to Industrial Harmony

A FIVE-POINT program aimed at promoting better understanding between representatives of management and labor was presented to a group of AFL business agents in San Francisco recently by Robert Grunsky, managing director of the California Metal Trades Association. He reminded his audience, at a luncheon meeting of the San Francisco Labor Council, that the business agents of both employers and employees have a major responsibility to the community to cut down the sources of industrial strife. To accomplish this, he suggested the following basic rules:

1. Don't stick your neck out by taking an unreasonable and unrealistic position.
2. Take a look at the other fellow's point of view and problems.
3. Keep in mind your community responsibilities.
4. Use facts—not fiction.
5. Make "strike" and "lockout" the last words in the labor relations vocabulary.

"The employees, your members," he said, "have got to be educated to the economic facts of life, taught that they must produce a day's work for a day's pay, and that they can no longer continue to expect to pile increasing costs on the employer and have him remain competitive.

"As business agents for the union, this means that you will carefully analyze the business situation, educate your members during the contract year to the problems so that they will not be demanding that you obtain for them gains which are unreasonable, unrealistic and out of line.

"It means for the business agent of the employers that he must carefully analyze these same factors and conditions to determine the just gains that the employees should be granted in terms of competitive conditions, production and general economic situation."

He congratulated the Labor Council on its system requiring sanction by the council before a strike is called, which has led to the settlement of numerous disputes. Mr. Grunsky described this as outstanding work, but unfortunately not all the unions in the area were a party to the system.

Mr. Grunsky pointed out that from 1934 to 1941 the San Francisco Bay area had received a very poor name and much adverse publicity, followed by a fine record in wartime, but now the country was again beginning to look on the area as a black spot in labor relations.

Strikes in the Bay area in 1948 and 1949 cost the community more than \$42,000,000 and were caused by the "failures" of the agents of both business and labor, Mr. Grunsky stated.

This figure is conservative, he said, and does not include indirect losses from diversion of business to other locales, failure of business to locate in this area or of present business to expand because of labor trouble.

Negotiation Procedures

As reported by Industrial Relations Council of Utah: An employer is privileged to present to his employees by speech or letter, a statement showing superiority of their non-union conditions over union working conditions.

If a supervisor attends a union meeting as an uninvited guest, the employer may be held guilty of unlawful attendance, whether management sent him or not.

A company may reject a union organizer who attempts to organize employees on company property and on company time, provided the organizer has ample time for his activities off company property and outside working hours. Supreme Court ruled that organizers must be allowed to see employees on company property if they can get to them in no other way.

September, 1949—WESTERN INDUSTRY



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Air-Jet System Smothers Smoke

The PliOJet over-fire air system for smoke abatement is planned to be used in plant boiler and furnace rooms to abate smoke, thereby saving fuel, producing greater combustion efficiency and greater plant cleanliness. The system prevents smoke formation through injecting secondary air into the fire and mixing it with the unburned gases to obtain complete combustion. The unit does this by means of over-fire air jets arranged in sets. *The Plibrico Jointless Firebrick Co., Chicago, Ill.*

1009-M

Veneer Retriever

The Smith Veneer Retriever is a heavy duty machine which is used for clipping and sawing veneer to length within the one machine; it will retrieve or salvage damaged stock from the green chain and dry stock from the dryers or that which is rejected at the glue spreaders and core saws. *George E. Zweifel and Co., Portland, Oregon.*

1010-M

Portable Hoister Raises, Lowers Loads

The winch on the Type DH Handy Hoister is constructed to enable platform to hold at any level; manufacturers say winch handle cannot spin or get away from operator when lowering load, and is designed to swing out of way when not in use; one revolution of winch handle gives full 3 in. lift. The hoister, which can be rolled from place to place, should have many uses around the plant or warehouse. *Lewis-Shepard Products, Inc., Watertown, Mass.*

1011-M

Fire Retardant Paint

Flame-Seal is a new fire-retardant paint which manufacturers claim can resist a 2000° blow-torch flame for 30 minutes without any flame spread. When fire attacks a combustible material which has been coated with the paint, it forms a protective white crust which completely discourages combus-

tion. The paint comes in 2 or 5 gallon cans in oyster-white flat finish, and requires no mixing of chemicals, being applied from its original container by brush or spray gun. *Stallton Chemical Corporation, Long Island City, N.C.*

1012-M



Multi-Barrel Tumbler For Mass Finishing

Up to 15 different items can be handled at the same time, without mixing, on this new multi-barrel tumbler, for deburring and polishing metal and plastic products, and each can be tumbled in the manner best suited to its requirements. Variables include wet and dry tumbling, wide range of speeds, rotary, centrifugal and end-to-end actions, and combinations of these actions; thus delicate parts which heretofore required deburring and polishing by hand can now be machine-processed without danger of deformation. *Hungerford Corporation, Big Flats, New York.*

1013-M

Bunnyhugger

Odd handling jobs peculiar to certain industries—like the handling of bales of fabric, large crates or ingots—are managed by the "Bunnyhugger," a new lift-truck that doesn't use pallets, but grasps the load between the forks in a pincher-like movement. This battery-powered truck has a capacity of 3750 pounds. *Yale & Towne Manufacturing Co., Philadelphia, Penna.*

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Use this postage-paid card to obtain further information on products mentioned on these two pages and on literature listed on the following page . . .

1014-M

Salt Tablets For Heat Fatigue

Salt tablets, widely used by industrial plants in warm weather to combat heat fatigue and reduced efficiency caused by loss of body salt through perspiration, now come in a dispensing carton which can be hung up on the wall at locations where workers exposed to extreme heat can easily get at them. One size of dispenser holds 1,000 tablets and the other, 500, and they are put out by *The B. F. McDonald Co., Los Angeles.*

1015-M

Lightweight Conveyor Easily Portable

The combination of a magnesium or aluminum frame with rollers made of plastic makes the new portable conveyor of *Alvey Conveyor Manufacturing Company, St. Louis, Missouri*, light in weight so it may easily be moved from place to place within the plant, or carried on a truck to speed unloading.

1016-M

Masonry Saws

The "Fireproofers" line of masonry saws all come with a patented cutting table—to adjust for cutting material of varying thickness, it is lifted and automatically locks in place, is easily lowered with fingertip control release levers. Saws are recommended for cutting all types of masonry products, such as glass, brick, glazed tile or clay tile. *Martin Fireproofing Corp., Buffalo, N. Y.*

1017-M

Corrugated Conveyor Belt

Ruff-Ridge is a conveyor belt made of a solid woven carcass impregnated first with a neoprene solvent cement for moisture resistance, and then coated with a blend of neoprene and natural rubber which is given a corrugated surface. The result, makers claim, gives the belt the chemical and moisture resistance of neoprene and the high physical properties of natural rubber, able to convey bagged or boxed materials up inclines of 30 to 40 degrees. *Russell Manufacturing Company, Middletown, Conn.*

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Also further information on the following products advertised in this issue:

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1018-M

Mechanical Bottle Washer

The Ogden machine for washing bottles can accommodate bottles of all sizes up to one gallon, operating equally well in thoroughly cleaning narrow or wide mouthed containers; bottles are placed on arms of the washer, which have sprung steel wire holders, so constructed that they are instantly self-adjusting to any shape bottle. Machine washes the bottles first in hot water, steam, detergent, then hot water again and dries them with hot air. It is made by *Ogden Filter Co., Los Angeles.*

1019-M

Midget Air Hoist

A new midget hoist measuring only 18½ in. long by 10¾ in. wide and 11¾ in. high is lightweight enough to be carried, installed by one man, and is planned for such jobs as moving equipment, hauling timber, repairing overhead cranes, spotting cars. Hoist is planned to lift a 600-lb. load at 50 feet per minute and comes equipped with a wide band-type brake to give positive holding power while the reversible motor permits lowering the load under power. *Ingersoll-Rand Company, Phillipsburg, N.J.*

1020-M

New Machine Bends Large-Size Tubing

Tubing up to 3 in. in diameter can be bent with the manually-operated tube bender being produced by *The Parker Appliance Company, Cleveland, Ohio.* With the new machine, bends up to 180° may be made, including offset bends and U-bends in the middle of tubes. Machine is reversible, and tube clamping and radius forming assemblies may be mounted on either side and successive right- and left-hand bends can be made.

1021-M

Roller Chain Couplings Feature New Design

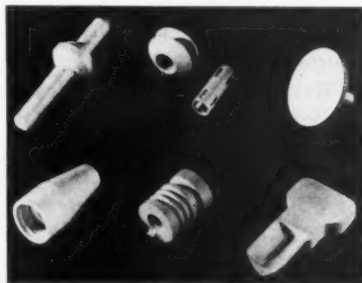
The new single connecting pin design incorporated into the roller chain couplings made by *Morse Chain Company, Detroit, Michigan,* is designed to increase the ease with which the couplings can be assembled or disassembled. The roller chain couplings come in 7 sizes ranging in capacity from 2.7 to 09.0 H.P. per 100 RPM and are carried in stock with a wide range of finished bores.

1022-M

Scrap Bin Truck

The new scrap truck being made by *Factory Service Company, Milwaukee, Wisconsin,* can be used together with a revolving head fork truck, which can pick up the loaded unit from either front or back to take it to the scrap pile; with the truck forks engaged in the channels, it is claimed the scrap truck can be turned to any desired angle, or completely upside down, while dumping, yet remains entirely secure. Truck is available with steel sides 20 in., 24 in., 28 in., 32 in., and 36 in. high.

1023-M



Industrial Ceramics

Coors Porcelain Co., Golden, Colo., are now putting out a line of industrial parts made out of ceramics, which material, they claim is especially suitable in cases where corrosion, wear, friction or high temperature might affect durability of metals or other materials, and also for electrical application where superior dielectric properties are required. The company also maintains a design engineering service for application of these materials to manufacturers' products.

1024-M



Midget Clamps Hold Small Parts

Three models of midget clamps just out are designed to hold small parts during machining operations. Model CHAC-250 is a heel cam clamping assembly, Model CCHA-2501, a center cam clamping assembly, and Model HCA-250, a hand-knob clamping assembly. Clamps are made by *Noble and Stanton, Inc., Bedford, Ohio.*

1025-M

Wire-Rope Grommet

The high strength of the all-steel wire rope from which the Cable-Laid Grommet of *American Chain & Cable Co., Bridgeport, Conn.,* is made permits use of smaller diameters than would be necessary with fibre ropes, and makes for a high safety factor. It comes in diameters from 9/32 inch to 1½ inch with rated capacity up to 53 tons in basket hitch.

1026-M

New Device Lifts Long Loads

Rol-a-Lift is a lifting and rolling unit to be used with a fork truck to help lift and move extra long loads. It comes in four models, all hand-operated, and combines a pair of handles, a pair of forks and a pair of swivel-type wheels with a hydraulic lift jack mounted on the steel frame. *Elwell-Parker Electric Co., Cleveland, Ohio.*

1027-M

General Purpose Winch

Lewis-Shepard Products, Inc., Watertown, Mass., are now making a compact planetary gear type winch which contains all the mechanism within the winch drum, and is completely protected from rust, moisture, etc., and thus can be used either indoors or outdoors. Winch can be mounted on any flat surface 5 in. by 5¾ in., and a total of 25 ft. can be wound in two layers on the drum.

1028-M

12-Pound Hand Truck

The new hand truck made by *Honeyman Manufacturing Co., Portland, Oregon,* weighs only 12 pounds, is only 12 inches wide, 45 inches high. Truck is made of aluminum alloy, has a rated capacity of 500 pounds and can lift more than 1500 pounds (by static tests).

1029-M

All-in-One Drafting Tool

Engineers, builders, draftsmen, typists, operators of duplicating machines will find the Circ-L-Scale very useful, since it can be employed as a protractor, compass, square, scale or lettering device. It comes in a clear plastic called Anderolyte, and is manufactured by *Lee A. Cason, Detroit, Michigan.*

READING GUIDE FOR WESTERN MANAGEMENT

A service for all management levels . . . current literature surveyed and appraised by the faculty of the School of Management, Golden Gate College

The Responsibility of Business Leadership

Edited by Harwood F. Merrill. Harvard University Press, Cambridge, Massachusetts, 1948, \$2.50.

This is a symposium of several articles on business leadership. The articles are based on speeches by the authors made at the Eighteenth Annual Conference of Harvard Business School Alumni Association at Soldiers Field, Boston, June 12, 1948. The introduction is given by Dean Donald K. David of the Harvard Graduate School of Business Administration.

This little volume (fewer than 100 pages) sets for itself the monumental task of defining the responsibility of businessmen to each of the many groups of people that are affected by their activities: the public, workers, the Government, consumers, stockholders, and the world at large. Even the fact that each of these topics is handled by one of the country's recognized business leaders does not keep so brief a treatment of so large a subject from being somewhat superficial.

After Dean David's solid and interest-catching introduction, the "panel of experts" and their respective topics follow in a logical exposition of the responsibilities of business leadership:

"Businessmen's Responsibilities to the Public" by Clarence Francis, Chairman of the Board, General Foods Corporation.

"Businessmen's Responsibilities to Economics" by Richard R. Deupree, President, The Proctor and Gamble Company.

"Businessmen's Responsibilities to Government" by Ralph E. Flanders, United States Senator from Vermont.

"Businessmen's Responsibilities to Consumers" by Jack I. Straus, President, R. H. Macy and Company, Inc.

"Businessmen's Responsibilities to Stockholders" by Harry A. Bullis, Chairman of the Board, General Mills, Inc.

"Businessmen's Responsibilities to the World" by Allen W. Dulles, Partner, Sullivan and Cromwell.

Perhaps the major thread running through all of these very readable articles is that the first responsibility of a businessman is to be a competent businessman. If six such outstanding leaders agree upon no more fundamental thought than this, the volume would be well worth the short time required to read it. Not so long ago, comparable business leaders (if not some of these) might have said that their sole respon-

sibility as businessmen was to make money. Each one of them today, however, recognizes that the businessman's responsibilities extend far beyond himself and that, in fact, his chief responsibilities are to others. All agree, moreover, that the responsibilities outlined must be accepted by the businessman—or that these responsibilities will be taken over by someone else, by some other group, and the businessman and the free enterprise he represents will move out of the picture.

Western management men will want to read and re-read some of these articles.

Reviewed by:

JOSEPH M. TRICKETT
Dean, School of Management
Lecturer on Management
Organization and Executive
Development

Management Planning And Control

By Billy E. Goetz. McGraw-Hill Book Co., New York, 1949, \$3.75.

The author describes this book with the subtitle, "A Managerial Approach to Industrial Accounting." This gives the impression that emphasis will be placed on the management aspects of accounting. While much of this book treats with management accounting, a major portion of the contents deals with management planning and control. The chapters pertaining to these latter subjects will interest many management readers.

In the section having to do with techniques of managerial planning the author gives a brief discussion on how problems are discovered. He points out that getting in a rut, or accepting the status quo, is a most regrettable condition. We are living in a dynamic business society where constant change is the rule and men in managerial positions who refuse to recognize and adjust to changing conditions are inviting a good deal of trouble for their company.

Effective measures suggested to keep top-management thinking abreast of the times are: (1) Outside contacts, reading, association meetings; (2) The exception principle of management; (3) A check list of management practices; and (4) A periodical management audit. In advocating this latter device the author makes a real contribution toward more effective management.

The author says that a complete management audit should cover the following:

1. The outlook for the industry.
2. The position of the company in the industry.
3. Company policies.
4. Company and departmental organization.
5. Personnel policies and practices.
6. Methods and procedures.
7. Company facilities.
8. The financial position of the concern and a forecast of its future.

By this means, important deficiencies can be called to the attention of management. Once a problem is brought to light, then and only then is it possible to initiate corrective measures.

In the chapter on managerial control the author gives a forthright description of what must be done if any type of control is to be effective. Since management's job is only partially complete when plans are developed, the function of control completes the cycle by seeing that events conform with plans. Any control system must be flexible enough to keep the organization functioning in spite of mistakes in planning and unforeseen events. As an example, when sales volume begins to decrease, a flexible expense budget planned in terms of sales begins to operate and some of the consequences of decreasing sales can be averted.

Throughout the portion of the book devoted to the relation of accounting to management, the author is not clear in the reasons supporting some of his conclusions. Thus, in one of his chapters, he concludes by saying, "Traditional cost data tend to be irrelevant and mischievous." He does not give adequate explanation to support his opinion.

He does recognize, however, that cost data prepared for one purpose are not always suitable for other purposes. His contention is that such data must be revised as price levels change. Cost data adjusted for shifts in price level would probably not be condoned at present, although such a practice may prove necessary in the future as more of our wage structures, etc., are hitched to price indices.

If the reader of this review holds a management position, if he wants to read something informative and thought provoking, and if he desires to keep up with some of the latest thinking on management control and control techniques, then this book will be of value.

Reviewed by:

WESLEY T. BENSON
Lecturer in Accounting and
Business Statistics

Helpful Literature

For the Plant Operator Who Wants to Keep Informed

2612L

Listing of German Dyestuff Formulas—A free listing of the reports available on formulas for German dyes and dyestuff intermediates is being released by the *Office of Technical Services of the U. S. Dept. of Commerce*. List includes reference to formulas for thirty blues, twenty oranges and a substantial number of reds, yellows, greens, browns, grays and blacks. Other reports listed describe laboratory and production methods and testing techniques.

2613L

Automatic Fasteners and Staplers — Companies making all types of products use automatic tackers and fasteners, whether it be the kind operated by hand-power, foot-power, air pressure or hammer action. *Fastener Corporation, Chicago, Ill.*, have just put out a useful 26-page catalog of their different types of automatic tackers, with suggestions for their use in various industries. The catalog includes four pages of photographs of the Duofast machines in action.

2614L

"Heat Treating Hints" is a four-page magazine put out by *Lindberg Engineering Company, Chicago, Ill.*, which contains several interesting short industrial articles, one on "Why Dies Break," another on "Selective Hardening" and a third, "Carbon Monoxide."

2615L

"The Marshall Plan Sales Planner" is the title of a new six-color, 30 x 40-inch chart compiled by *Westinghouse Electric International Company, New York*, outlining in graph form the 12 steps American suppliers should take to secure ECA orders and collect payment in dollars under the Marshall Plan during the 1949-1950 period.

2616L

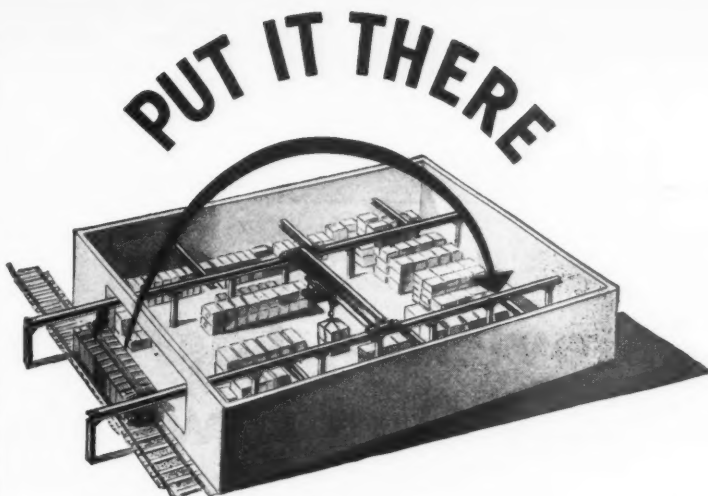
Stop Watch Catalog—For users of stop watches and other timers a new catalog of stop watches and chronographs has just been issued by the *Clebar Watch Company, New York*. It illustrates a complete line of timers for all laboratory and industrial uses.

2617L

Care of Batteries — Battery purchasers, users and maintenance men will be interested in a new 40-page pocket-size handbook on the care of motive-power batteries. The book has sections on care and operation, maintenance and repairs, parts and technical data, and includes photographs and illustrations. It is put out by *The Gould Storage Battery Corporation, Trenton, N. J.*

2618L

Sling Chain Catalog—Advantages, specifications, description and working load limits of the steel, iron and alloy sling chains made by *American Chain Division of American Chain & Cable Company, Inc., York, Penna.*, are described in a new four-color 32 page catalog. All attachments and their uses are charted for easy reference, and each page contains a finger-tip index.



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REGIONAL REVIEWS

Tehachapi to Tijuana

Television, Last Year's Babe, Now Outgrows Short Pants

Infant industry's rapid strides astonish seasoned observers; Social, economic, and industrial progress felt in many fields

LOS ANGELES—Strangely prospering in the midst of a general business slow-down is a newborn industry whose rapid growth astonishes local observers.

The infant prodigy is television—and one of the most interesting aspects of the miracle is its far-reaching influence on other local industries which might at first glance seem entirely remote.

While the radio industry struggles with one of its periodic fits of over-production, with prices being slashed and manufacturers jettisoning inventories, Packard-Bell has just announced a 50 per cent step-up in output, and activity at Hoffman Radio, which only recently emerged from the red-ink stage, is steadily rising. Recently the two companies were turning out a total of 2500 to 3000 receivers monthly, a gross volume of some \$10,000,000 annually. Conrac, Inc., a newcomer to the television field, likewise will boost its production sharply this fall.

So unpromising did the outlook seem for the radio business that Gilfillan, for instance, last year abandoned its well-established niche in civilian radio manufacturing to concentrate entirely on military work.

But like the horseless carriage, the new contraption has endeared itself to the public so quickly that already it is bringing far-reaching changes affecting the whole local economy. Manufacturer H. L. Hoffman summed it up recently by saying that "Television has become the second most important investment of the average southern California wage-earner, second only to his automobile." This means that an impressive number of buyer dollars are being diverted to

this field, affecting manufacturers in many unrelated fields. For instance, some examples:

1. TV is recasting the family's scheme of living by creating a new problem of "Where shall we put it?" Furniture must be rearranged, home traffic rerouted, and space provided for not only the family but for neighbors who "happen" to drop in. This means more, and different, furniture. TV also creates a need for more living space. Some home owners gave added rooms or equipped patios or rumpus rooms as TV "theatres." Others actually have built new homes around the TV receiver.

2. TV is keeping the family at home. Impact on auto and tire business, gasoline sales, and other industries profiting by American gadabout tendencies, has just begun to be felt. Woodbury College's Television Research Bureau, which recently completed the first of a series of mass investigations into local television progress, found that 65 per cent of TV set-owners declare they visit their friends and relatives less often. The average TV audience was found to be 4.4 persons, or a third more than the average-sized family, revealing the (perhaps temporary) "drop-in trade."

3. TV is making inroads into other entertainment fields, notably radio and the movies. Woodbury's interviewers found 77 per cent of those questioned now go less frequently to the movies, and 66 per cent testified they attend other "outside" events less often. A heavy hand is being laid on the standard radio audiences, with 50 per cent of TV owners reporting they "practically never" listen to their regular radio sets any more.

4. TV promises to offer a new advertising medium that will divert much revenue from established channels as its possibilities are exploited. Fears that public antipathy to visual "commercials" would prevent television from attracting enough sponsorship to make it self-sustaining seem allayed by the survey's finding of a 67 per cent favorable reaction to TV ads in their present primitive form.

A few months ago, local TV pioneers were patronized loftily by Eastern TV operators. Backed by large, concentrated audiences in the heavily populated Eastern areas, New York and Chicago TV was generally conceded to be years ahead of local efforts.

Today seven stations are operating in Los Angeles, blanketing southern California with their programs which are addressed to an estimated 140,000 receivers representing a potential audience of 500,000. And each day the audience is growing at a rate recently estimated as large enough to fill a fair-sized neighborhood theater. In Los Angeles alone, service men currently are installing about 300 new sets daily.

Most significant is the discovery in recent studies that now TV is rapidly shifting from a luxury to a mass market. Sylvania found that 58 per cent of the sets belong to families earning less than \$5000 a year, and this group is buying them much faster than higher income-bracket purchasers. Down, too, have come prices. More than \$100 has been knocked off some models. Admiral has become the first company to turn from costly hardwood cabinets—usually the largest single item among radio receiver costs—to one-piece plastic cases. Elec-

(Continued on page 74)

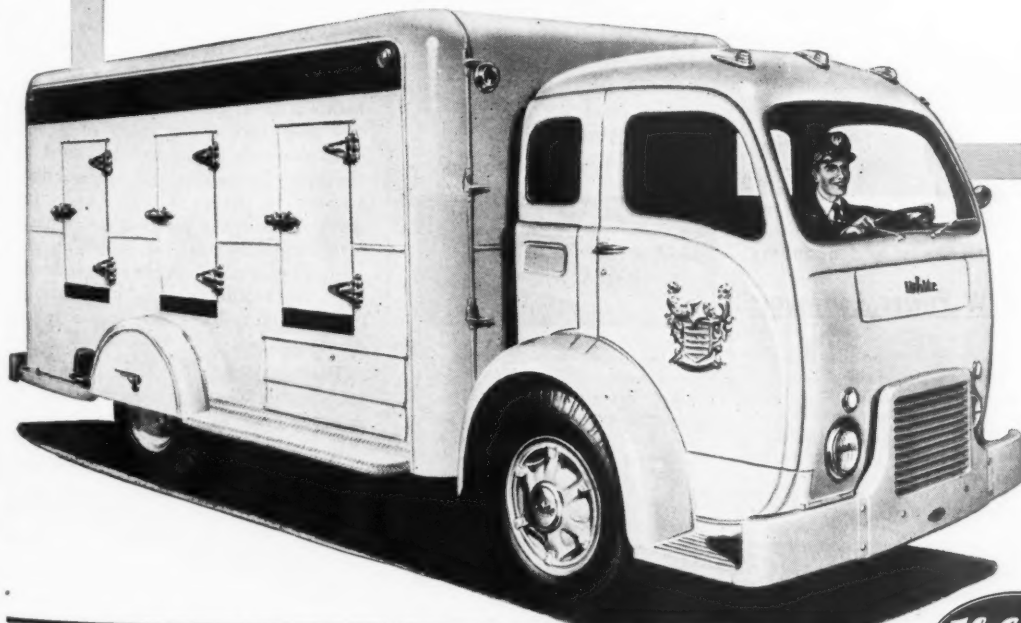
The Most Important Motor Truck Advance in Years

**An Entirely New Kind of Truck . . . Designed to Reduce Per Unit Cost
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THE WHITE MOTOR COMPANY, Cleveland 1, Ohio

The White Motor Company of Canada Limited. Factory at Montreal



FOR 50 YEARS THE GREATEST NAME IN TRUCKS



L. A. REGIONAL

(Continued from page 72)

tronically preheating powder bricks, Admiral's suppliers turn out the plastic shells on a 2000-ton press at about one-third the cost of wood cabinets.

In this boom-or-bust industry, the TV pioneers may face a rugged career. Mortality has been as high as in the automobile industry, with more than half of the post-war crop of new radio manufacturers folding up in their first two years. Early this year, TV trade pipelines had about a two months' stock, meaning that manufacturers would have to limit sales to about the same rate as current sales. But dipping costs, better programs, more stations, and widening coverage have combined with the well-known fondness of Americans for en-

tertainment, to expand the market enormously.

Eastern firms still dominate the television field as they have always dominated radio manufacturing, but in TV the West may hold a local advantage for some time to come. Video sets are complex at best—about 700 parts as compared with perhaps 175 in the ordinary radio receiver. This means heavier chasses, more freight costs. In the opinion of Manufacturer H. L. Hoffman, "Television is and will remain a heavy unit with a high freight cost when manufactured in the Middle West or East. Even though a local manufacturer may have a lower volume of production, the freight more than offsets the difference in quantity of production."

How long this weight differential will remain at its high level is, of course,

problematical, now that some abnormal costs are disappearing from the picture. Already the "recession" has broken the freight car bottleneck, dealing a death-blow to the needless back-hauls, demurrage charges, and other stratagems used by many shippers to hang onto precious cars as long as possible. A strong movement is afoot to abolish the government transportation tax. A new ruling on stop-in-transit shipments, allowing Western manufacturers the benefit of carload rates when cars are stopped in transit for partial unloading, has been handed down by the Pacific Freight Tariff Bureau. Meanwhile carloadings are holding up strongly in the West, declining only 1.9 per cent from last year, with a 3 per cent increase in automobile shipments predicted for the balance of this year.

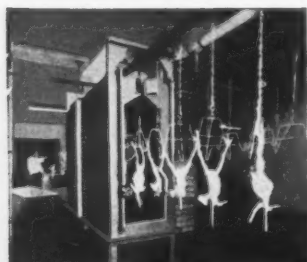
Nearing complete shutdown is Los Angeles' synthetic rubber industry, now that Standard Oil's butadiene plant and its working twin, the Goodyear synthetic plant at Torrance, are winding up their operations. Only survivor of the six big operations that were going full blast during the war is Dow's styrene factory. RFC has pinched off the two producers because of the higher cost of basic raw materials.

Offsetting local industry's loss, to some extent, is Goodrich's move to start production here of a new puncture-sealing, tubeless tire. It will be the rubber company's first commercial production of the new tire anywhere in the country. Added also to the local rubber colony is a new plant for Arrowhead Rubber, which plans to treble its output of industrial rubber goods as soon as it moves in.

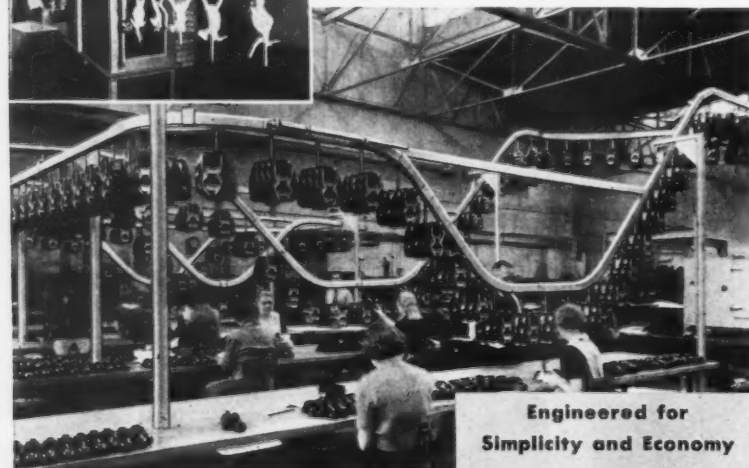
Among late arrivals in southern California is Lever Brothers' new \$25,000,000 soap, shortening, margarine, and salad dressing plant, just launched by the soap opera kings with a resounding fanfare. Its output will be largely for distribution in the Western states, heretofore supplied from the Mid-West and East. The celebrated climate is permitting plant features new to the soap business, including location of much equipment outdoors.

Ford, which just two years ago launched its West Coast purchasing program, announces that more than \$45,000,000 worth of parts for its cars and trucks were manufactured on the Coast last year. This output includes more than 500 parts ranging from small bolts to forgings, springs, seat covers, rubber and fabric, die castings, and other components.

Attention, would be subcontractors: Still on Ford's "want" list are western sources for tail pipes, mufflers, and a good dependable frame plant.



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Make Education Help Industry

KEYNOTE address of the summer management institute sponsored by the Institute of Industrial Relations and the College of Business Administration, University of California, Berkeley and Los Angeles, at Asilomar, Pacific Grove, September 10-16, will be delivered by Robert E. Gross, president of Lockheed Aircraft Corporation.

The institute is to be a working conference to discuss ways and means of developing a closer relationship between the university and West Coast business and industry. It will be primarily a series of conference discussions on different phases of administrative subjects. The members of the conference will have an opportunity to discuss between themselves and with the university staff the subjects and what both the university and industry can do to develop the university curriculum so as to direct the universities' program to current and future needs of West Coast business.

Speakers on evening programs are as follows: "The Economic Outlook," Russell G. Smith, executive vice-president, international banking department, Bank of America; "Cost Problems in Modern Industry," Dudley E. Browne, controller, Lockheed Aircraft Corporation; "New Problems Confronting Management," Paul Davies, president, Food Machinery Corporation; "Key-stones of a Prosperous Economy," Neil H. Jacoby, college of business administration, University of California, Los Angeles. "Previews of Progress" will be presented by Donald Still, regional public relations manager, General Motors Corporation.

Companies who will participate include: Lockheed Aircraft, Bank of America, C & H Sugar, Columbia Steel, Kaiser Company, Consolidated Steel, Weber Show Case, National Auto Fiber, Square D Company, Spreckels Sugar, P.G.&E., Shell Oil Company, General Electric, Tide Water Associated Oil, Standard Oil of California, Cutter Laboratories, North American Aviation, Douglas Aviation, Northrop Aviation, Hughes Tool Company, Axelson Manufacturing Company, C. F. Braun Company, Riverside Cement, Pacific Mutual Insurance Company, Rockwell Company, Lane Wells Company, United Airlines, Dow Chemical Company, and California Electric Power Company.

Reservations may be made by contacting Dr. Abbott Kaplan, Institute of Industrial Relations at U.C.L.A., Los Angeles 24, Calif.

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REGIONAL REVIEWS

Sierras to the Sea

Year's Bay Area Investments Exceed 216 Million Dollars

Los Angeles region emerges a close second in new ventures and expansions; Small businesses are being given more attention

SAN FRANCISCO—The San Francisco Bay region has led the Los Angeles metropolitan area in industrial plant construction and expansion by a slight margin for the last two years, according to the San Francisco Chamber of Commerce.

For 1947 and 1948, the San Francisco Chamber's tabulation shows \$216,093,900 as against \$196,993,000 reported by the Los Angeles Chamber of Commerce. Among the new plants and expansions listed are the following:

General Electric, Westinghouse, General Foods, Kelsey-Hayes, Pittsburgh Plate Glass, Blaw-Knox, Campbell Soup, Owens Corning Fiberglas, American Radiator & Standard Sanitary, Standard Oil of California, United Air Lines, H. J. Heinz, Johns-Manville, Butler Mfg. Co., Western Crown Cork & Seal, Colgate-Palmolive, International Minerals & Chemical, Shell Chemical, Sperry Flour, Beech-Nut Packing, Food Machinery, H. S.

Crocker, U. S. Envelope, Columbia Steel, Pittsburgh-Des Moines Steel, Chrysler Corporation, and Bethlehem-Pacific Coast Steel.

Along less spectacular lines is an operation being carried on by the state's Department of Industrial Education, a comparatively little known organization financed partly by federal funds allotted by Congress for the promotion of small business. The Department is planning a panel on counsel for small business at the California State Fair at Sacramento, intended not only to give the venturesome individual with a few dollars plus an idea how to get started in a small way, but also how to avoid losing his capital through ignorance of the most common pitfalls that beset new businesses.

Another project of this organization is a traveling exhibit on store modernization, to be moved from one small city

to another to demonstrate what can be done to make store fronts and interiors more attractive. It is also hoped to go even further and introduce plans for developing business centers along more efficient lines, such as malls where all vehicle traffic is cut off, so that the store fronts can be devoted entirely to display, with parking and service facilities on the streets on which the rears of the stores face.

In such ways as this the industrial education authorities hope to encourage more employment to take care of the ever-continuing immigration of population from other parts of the country.

Still another effort to develop small business in the northern part of the state is the opening of a San Francisco-Oakland procurement office of the U. S. Air Force at the Administration Building, Oakland Municipal Airport. Captain James M. McMahon is in charge. This is a sub-office of the procurement office in Los Angeles, where Col. Thomas H. Chapman is chief, in charge of administering contracts and conducting industrial planning functions in the seven Western states.

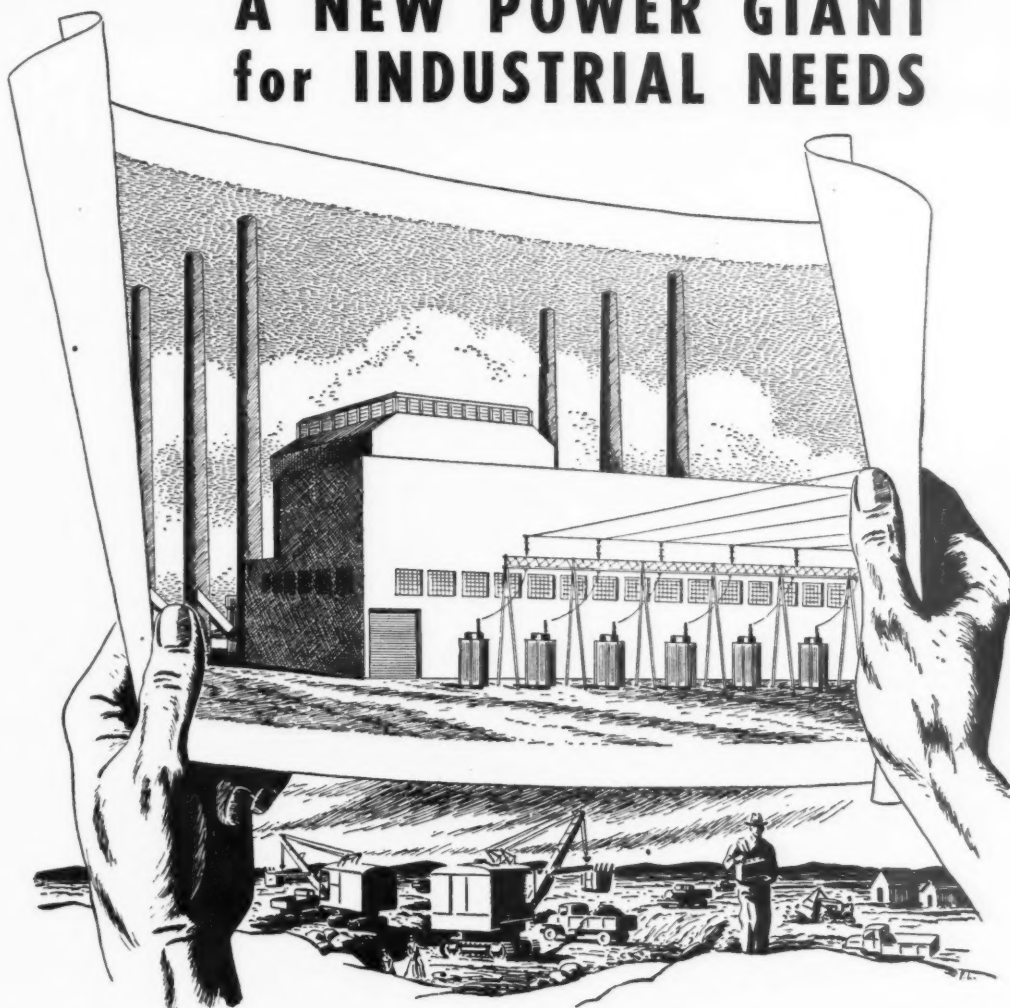
"If any small business is a responsible establishment," says Major General K. B. Wolfe, director of procurement and industrial planning for the Air Materiel Command, "there is no reason why it cannot bid on any contract whose requirements it can meet. Establishing the responsibility of an unregistered company is a portion of the Industrial Planning Division, and can be accomplished in short order."

Efforts of the Golden Gate Paint, Varnish and Lacquer Club to develop technically trained men for the paint factories in the northern part of the state have resulted in the establishment of a course in paint technology at San Francisco City College, and 13 students were graduated from it in June. Southern California paint men are hoping to set up similar educational facilities in their area.

* Below, Alden G. Roach, president of Columbia Steel Co., greets two "right hand" men. O. L. Pringle, left, formerly a vice president in charge of operations, is now vice president in charge of sales. Laurence S. Dahl, newly-elected vice president in charge of operations, comes from Carnegie-Illinois Steel Corp., also a U. S. Steel subsidiary.



A NEW POWER GIANT for INDUSTRIAL NEEDS



One of the largest powerhouses ever built in California is now underway—Contra Costa Steam Plant. When completed, it will become P. G. and E.'s 76th major plant—will create 402,000 new electrical horsepower. That's enough energy to supply Oakland, Stockton, Richmond, Tracy, Emeryville and South San Francisco. It will include three mammoth generators, fuel oil storage tanks, switch yards and boilers tall as eight-story buildings.

Good jobs will go to about 1,500 workmen. Wages will account for much of the project's \$51,500,000 construction costs. A large share of these wages will flow to local businesses.

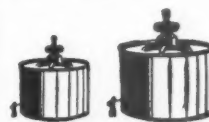
Schools, too, are a principal beneficiary wherever P. G. and E. builds plants because of the increased taxes the Company pays in the communities where our properties are located.

Work never stops on our power-building program

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PACIFIC GAS AND ELECTRIC COMPANY

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REGIONAL REVIEWS

Olympics to the Coeur D'Alenes

Navy Lifts Alaska 'Snow Curtain,' Reveals Natural Gas Discovery

Result of four years' prospecting touches off speculative thinking in Seattle area; Where there's gas there may be oil.

SEATTLE—First discovery of natural gas in commercial quantities in the American Arctic has been revealed with the lifting of a veil of secrecy by the Navy Department. Official announcement of the new find, fruit of Navy prospecting which has been going on in the frozen north since 1944, has released a wave of speculative thinking in the Seattle area, where activities in Alaska always are accorded keen attention.

Navy's operations have centered around Point Barrow, bleak and most northerly outpost of the United States. Back in the Harding administration an immense area of otherwise worthless land was set aside as a petroleum reserve for the Navy. The producing well now brought in is six miles south of Point Barrow, field headquarters of the 37,000-acre Petroleum Reserve No. 4. Discovery of gas in commercial quantities was made months ago, but secrecy was preserved until a pipe line from the well to headquarters could be completed.

Navy will make immediate use of the gas for heating and cooking needs of its personnel at Point Barrow, which now numbers some 450 civilians. Living in Quonset huts, the men have found that two oil circulating heaters were none too many to make even the smallest building comfortable in the long, dreary and dark winter during which temperatures of 40 degrees below zero are common.

No production figures have been released, but the statement has been made that to make withdrawal commercially profitable, fields should be capable of

delivering 100,000 barrels a day from a reserve of approximately 500,000,000 barrels. Five deep wells have been drilled thus far and another three are going down during this summer. The cautious statements thus far released are at least indicative that a new field of gas has been tapped, and quite likely oil, too. The Navy goes so far as to say they are "encouraged" by the prospects of oil in commercial quantities.

While these are new fuel supplies specifically held for the defense arm of the government, and about as remotely removed from transportation as one could imagine, nevertheless the discovery may have consequences of importance in the field of industry. A supply train of ten ships, preceded by an icebreaker, left Seattle July 19 to run the ice floes to Point Barrow during the pitifully brief season with another year's supply of food and equipment. Current work is being done under a \$14,000,000 appropriation which extends to June 30, 1950. Indications are that prospecting and development will continue beyond that date.

Other sectors of the fuel and power front hold interest in the Seattle area. A call for bids by the Salt Lake Pipe Line Co. holds promise for the region's industry. The company, a wholly-owned subsidiary of Standard Oil Co. of California, has asked for bids to construct 320 miles of pipe line from Salt Lake City to Boise, Idaho, at an estimated cost of \$6,000,000. This is proposed as the first leg of an overall project that will eventually reach a terminal in Western Washington on the Columbia

River. The line will serve Standard's recently constructed Salt Lake refinery.

Incidentally, the Washington State Public Service Commission recently reduced railroad and truck rates for bulk transportation of gasoline and other petroleum products. The cut averages 10 percent to most Washington points.

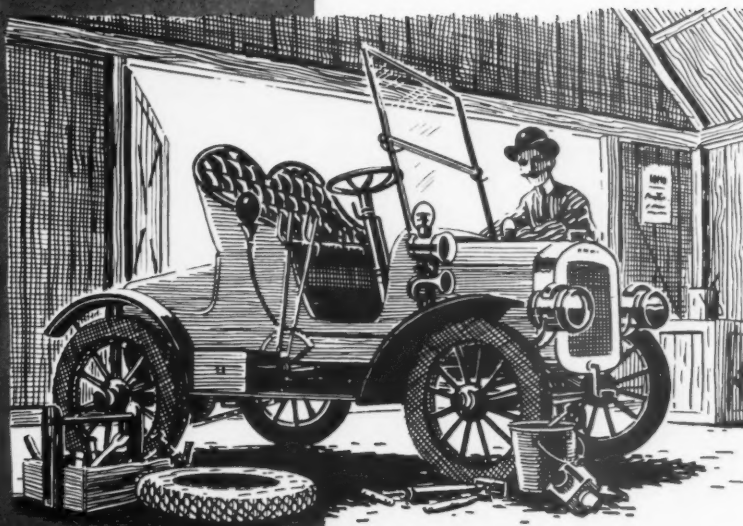
The fight on the controversial proposed Columbia Valley Authority still rages, with industry generally apprehensive that creation of a CVA will mean more limitations on free enterprise. Among the more recent developments in this battle was the endorsement of the CVA by the Washington State Federation of Labor (AFL) at its 47th annual convention in Spokane. Delegates heard a great deal of hot debate on the subject from both camps, with big names on the speaker's roster.

Industry in this area now has a first rate link with Alaska and the Orient with the formal dedication of the new \$11,000,000 Seattle-Tacoma International Airport at Bow Lake, located on high ground between the two principal Pacific Northwest cities. Dedication ceremonies caused 30,000 air-minded citizens to jam into the new facilities and inspect the huge new planes which serve all parts of the world. Air transportation companies using the new field include United Air Lines, Northwest Airlines, Pan American World Airways and Western Airlines.

Industrial leaders have become increasingly concerned with the condition of the State of Washington's finances. State Treasurer Harry Tom Martin re-

(Continued on page 80)

WHEN THE FIRST AUTOMOBILE WAS BUILT IN THE WEST



PACIFIC-WESTERN geared products were already old-timers

The first western automobile was built in northern California, almost fifty years ago. Then as now, the metal-working and fabrication industries of the west used the craftsmanship and experience of "Pacific-Western" for gears and geared machinery.

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PACIFIC GEAR
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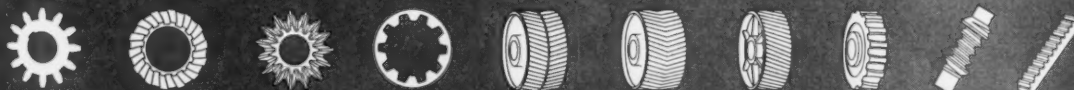


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GEAR WORKS

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GEARS OF ALL TYPES AND SIZES



COMPLETE LINE OF GEARED PRODUCTS



Steel rods are heated to 2000° in this gas-fired furnace and go through rollers in one continuous operation at *Gettins Steel Company, San Francisco*—prefabricators of steel materials and window frames for oil stations, light construction.



GAS FUEL SPEEDS PRODUCTION OF STEEL RODS



Because large mills could not supply rolled material quickly, "Gettins Steel", several years ago, set up its own milling operation, utilizing gas fuel.

Result: Two men, with the aid of one gas-fired furnace, can fabricate several tons of steel per day. Speed and dependability of gas fuel are stressed by management as factors contributing to the

continued success of the operation, with a larger furnace now being planned for extended production.

Whatever your heat problems or needs, your gas company's industrial engineers make it their business to help you utilize gas, the modern fuel, to best advantage . . . and profit! Call them.

...Another essential, profitable use of

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PACIFIC COAST GAS ASSOCIATION

SEATTLE REGIONAL (From page 79)

cently made public a report which showed a rapidly dwindling state general fund.

Indications are that a showdown will come about the first of the year and that at that time the state will be out of money to pay its bills for education, social security and other functions supported by general taxes. There is increasing indication that Governor Langlie will invoke a special session of the legislature. The legislators went home last spring after approving much new tax-consuming legislation, but without providing the hard money to cover. Any special session is bound to be long and full of wrangling.

Two prospects are within sight to alleviate the financial predicament—cut government services of the state or raise new taxes. Even severe cuts in services promises inadequate relief, while the prospects of higher taxes, and particularly the introduction of a state income tax—from which the state is so far immune—is no pleasant thought for business men to contemplate in a period of general retraction. Worst thorn is the fantastic social-security spending which is controlled in detail by the terms of Initiative No. 172, which was rolled into Olympia by the people directly under the obvious urgings of Communists in the not too well screened background. It is a cradle-to-grave type of measure and the costs are utterly staggering. If No. 172 is to remain on the books as a permanent fixture it seems bound to have a discouraging influence on Washington industry, with the additional prospect of attracting to the state an increased indigent population.

Construction is the brightest spot in this corner. Big projects for electrical power development are in progress, on both sides of the Cascades, and others are in the making. Reclamation works in the Eastern part of the state are also on a big scale. Seattle is witnessing a big assortment of new buildings of major size going up, both public and private. A new apartment building in the famous Denny Regrade district, has just been started; it is reported to carry the largest FHA loan in the country in its class. State highway construction is moving with great acceleration as a result of the funds in sight accruing from the increase of 1½ cents in the state gasoline tax by the last legislature.

Mortgage loans for the first half of the year held just about even with the same period in 1948. That holds for new loans; renewed loans were somewhat higher than last year.

The Seattle Chamber of Commerce has reported that in the city's metro-

politan area, industry made capital expenditures of well over \$7,000,000 for the first half of 1949. Fifty-eight plants were involved.

Flour mills, in common with such forest industries as pulp, lumber and plywood, have been having a rather bad time. Milling men estimate that about 45 percent of production capacity has been closed down since the first of the year. That's for Washington, Oregon, and northern Idaho.

Blame for the situation has been placed by local millers on politics and army purchasing policies. They say the Commodity Credit Corporation has bid up the price of Pacific Northwest wheat for Japanese and Korean relief so much that Kansas and Texas mills have been able to move in and take away California and other markets formerly served regularly with Pacific Northwest flour.

Before that, the government's export license policy nipped off Pacific Northwest flour customers in South and Central America—American wheat was going free to Great Britain while Canadian millers went down and took care of the Latin Americas. On top of that, the Communist spread in China has closed that sales counter. The effect of these blows to Pacific Northwest millers, wherein their local wheat is shipped out whole, has been to cut employment rather sharply, to close some of the smaller plants entirely, and to cause a shortage of mill feeds.

Employment conditions in the state, incidentally, are off quite a bit, although spotty. They were alarming enough, at least, to cause the president of the Washington State Federation of Labor to report at the organization's annual convention that many of the component unions have "a large unemployed membership" and to call on Congress to investigate "the trend toward another depression."

And speaking of overseas trade, Seattle's newly-authorized foreign trade zone was scheduled to open for business September 1. The new zone facilities will be on the East Waterway Dock and will be Trade Zone No. 5 in the United States.

Deductions of one per cent from paychecks of Washington industrial employees for the state health and accident program, which were to start July 1, have been held up pending the outcome of a friendly suit on a constitutionality test. A referendum petition on the new compulsory program enacted by the 1949 legislature has been filed and it is now virtually certain that the new law will be held up until the 1950 election.

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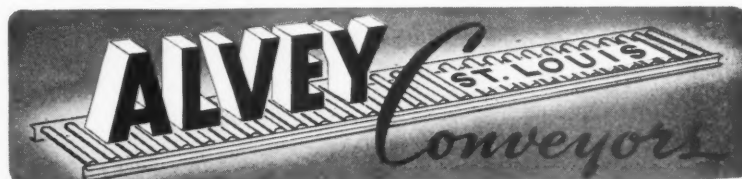
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REGIONAL REVIEWS

The Wasatch Front

New Industries Take Local Labor; Unemployment Remains Static

**Utility plans expenditure of \$61,000,000 over five year period;
Inadequate regional water supply in process of being eased.**

SALT LAKE CITY — With coal mining at a seasonal low ebb and a segment of the nonferrous metal industry idle because of low metal prices, Utah has experienced no significant decrease in total employment or increase in unemployment.

Total employment in June was 218,000 out of a total estimated work force of 231,000. The number of registered unemployed was 13,100, but a few thousand of these were young students seeking temporary work.

Estimated total work force in June a year ago was 228,000, the number of employed was 221,000 and registered unemployed totaled 7,400. The comparable figures for June 1947 were: total work force, 229,000; employed, 220,000; unemployed, 8,800.

The state department of employment security had not compiled the July statistics when this was written but a check of available data indicated there would be little if any change in the unemployed total and an increase in total employed in manufacturing.

Some lines of manufacturing have cut back employment during the past two or three months but enough new industries, mostly small, have been springing up to counteract the layoffs. Another offsetting factor at present in seasonal industries, notably canning.

In spite of some decline in electrical power consumption in its territory for the first time in several years, Utah Power & Light Co. is going ahead with its \$61,000,000 expansion program over the next five years. Projects costing about \$42,000,000 are set up for this year and the next two years and the company has filed an application with the Securities Exchange Commission to market \$3,000,000 in bonds and issue additional common stock to partially finance the program.

A large part of the new investment will go into generating facilities, some of which will burn oil and some coal.

The company is proceeding on the theory that development of the Colorado River in the upper basin, the chief future source of hydroelectric power, cannot possibly come along fast enough to meet the area's power needs. If the hydroelectric power becomes available at a later date, the steam plants now abuilding and projected, will be useful for firming purposes.

A \$69,000,000 Weber Basin reclamation project, which has been approved by the Interior Department but which has not yet hurdled the Appropriations Committee, would supply irrigation, industrial and municipal water to an area that constitutes the heart of the Wasatch front's industrial future. The 285,000 acre feet of new water which would be developed would be used in the 40-mile section between Salt Lake City and Ogden, where the state's military establishments and oil refining industry are now concentrated.

Served by all the railroads which touch the state, and located between the state's two largest markets, it is a logical location for future industries except for the fact that the water supply is inadequate for what is already there. The partially completed Provo River project, which dictated the location of the Geneva steel plant, has eased the water supply situation in Salt Lake City and to the south for a distance of 40-odd miles. And the new proposed project would accomplish the same thing for the Salt Lake-Davis County-Ogden area.

The project, as set up by the reclamation bureau, would provide water for 70,000 acres of unirrigated land, supplemental water for 30,000 acres which now has an inadequate supply and 40,000 acre feet for municipal and other

purposes. Costs would be allocated \$40,200,000 to irrigation, \$18,800,000 to municipal, and \$11,500,000 to flood control and recreation.

Incidentally, the possibility that atomic energy will some day make hydroelectric power obsolete is now influencing the Reclamation Bureau's planning for future multiple-purpose reclamation projects, according to Michael Straus, the commissioner. During a recent visit here he said the Atomic Energy Commission had advised against deferment of projects on the theory that atomic power would displace the hydroelectric.

Pacific Northwest barge lines, and other protestants, have apparently won their fight to block a freight reduction on bulk shipments of refined oil products from Salt Lake area refineries to Idaho, Washington, and Oregon, although the case is still under investigation. But it looks like a hollow victory. For Standard of California has called for bids and will start construction late this summer on a pipeline to the area. Thus both the barge lines and the railroads will permanently lose this piece of business.

The growing dependence of states upon federal aid is emphasized in a research report on the subject recently completed by the Utah Foundation, a non-profit tax research organization. The report shows that from a puny \$1,342,783 in federal aid received by Utah in 1930, the payments soared in fiscal 1948 to more than \$38,000,000. Of this amount \$15,404,670 was allotted to the state for 43 regular, continuing programs and \$22,983,274 for veteran benefits.

Federal tax collections from residents of the state for the same year was estimated at \$170,500,000.

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A Health & Welfare Plan



Trustees of the California Metal Trades Association Trust met with Ralph Walker, vice president of Pacific Mutual Life Insurance Company (second from left), to discuss the association's new insurance program, which covers about 10,000 metal tradesmen. Pacific Mutual is underwriting the program. The trustees (left to right) are A. A. Browne, general manager, Pacific Electric Manufacturing Corp.; Robert Grunsky, managing director of the association; John B. Lauritzen of Littler, Coakley & Lauritzen; D. E. Golden, executive vice president, Schlage Lock Co., and S. D. Russell, president, Phoenix Iron Works. The health and welfare plan includes life, accidental death and dismemberment insurance and disability benefits for employees and hospitalization, medical and surgical benefits for both employees and their dependents.

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REGIONAL REVIEWS

Continental Divide

Industrial Activity Increasing Faster Than National Average

Atomic age wreaks profound changes in New Mexico landscape and economy; D&RGW R.R. takes on UP in freight rate battle.

DENVER—Some interesting long-range trends were revealed when the 1947 Census of Manufactures figures were released a month or two ago. Comparing 1947 with 1939, the figures show the number of production workers and the number of manufacturing establishments in each principal city and each state.

The marked rise in factory operations is most evident in Colorado, New Mexico, Utah and Wyoming. In most instances the trend has continued, with 1949 figures higher than those for 1947, in the judgment of qualified observers of the area.

Production workers in Utah cities increased from the 1939 to 1947 figures as follows: Logan, 177 to 273; Ogden, 1,543 to 2,264; Provo, 171 to 490; Salt Lake City, 3,282 to 6,031. The number of manufacturing establishments for the same towns rose as follows: Logan, 16 to 18; Ogden, 58 to 69; Provo, 23 to 29; and Salt Lake City, 217 to 312.

In Wyoming towns the gain was comparable: Casper, 437 in 1939 and 751 in 1947; Laramie's production workers increased from 48 to 133 and Sheridan from 122 to 271.

New Mexico's mushrooming Albuquerque increased from 399 to 1,153; Clovis from 93 to 113; Roswell 135 to 235 and Santa Fe 131 to 340.

Colorado's Colorado Springs increased from 358 to 822; Denver from 11,370 to 24,337; Greeley 153 to 292; Pueblo 541 to 1,137 and Trinidad 113 to 240.

These and other pertinent facts are available from the Department of Commerce Field Offices in Denver, Cheyenne, Albuquerque, and Pueblo. State summaries will be available pretty soon.

While New Mexico and Nevada each doubled their factory employment in

the 1939-1947 period, Montana was gaining 89 per cent, Colorado and Arizona each 83 per cent, and Utah 82 per cent. Average gain in the United States was 53 per cent. Falling below this average was Idaho with 50 per cent gain, and Wyoming with 33 per cent gain. Idaho's atomic plant at Arco will push it up in the coming decade and Wyoming's chemical and petroleum processing plants, developed in the past couple of years, will give it a better showing when the more complete decennial census of 1950 is made.

Denver businessmen also note that another important part of their trade territory — Nebraska — scored the nation's greatest relative gain in manufacturing activity in the 1939-1947 period with an increase of 105.5 per cent. Cornhusker factories now employ about 50,000 workers in 1,400 plants, compared with 18,000 production workers in 1,039 plants in 1939. Value added by manufacture jumped from 68 million dollars in 1939 to 260 million in 1947.

Union Pacific railroad towns in Nebraska have 173 new industries since 1940, including 12 agricultural implement firms. There were 164 new industries or expansions on Burlington lines in Nebraska in 1948 alone. The state's railroads hauled three times more tonnage of manufactured goods out of Nebraska in 1948 than they carried in 1940, while the intake tonnage doubled.

Hello Girls Get Sandia

Albuquerque's great what-is-it has been annexed to the already sizable empire of the American Telephone & Telegraph Company and its affiliated manufacturing company, Western Electric. Former operator (since 1945) of the atomic energy commission's Sandia lab-

oratory just east of Albuquerque was the University of California.

The enterprise had grown too big for U. of C., and the AEC decided the Bell Laboratories and Western Electric were the agencies best suited to take over and carry on. U. of California operates the Los Alamos scientific laboratory, 110 miles northwest of Sandia.

The contribution Bell Laboratories and Western Electric made during the war in developing radar and other former "secret weapons" earned the telephone company units the right to handle the Sandia operation, final link in the operations of the atomic energy commission with Uncle Sam's military forces.

Bell and Western Electric officials are in Albuquerque, taking over the reins of the Sandia plant. Dr. Mervin J. Kelly is in charge for Bell, aided by Donald A. Quarles and they'll be glad to have you come over and help make atom bombs. Brig. Gen. James McCormack, Jr., is in charge for the military forces.

Both the Sandia and Los Alamos operations are directed from Santa Fe, where Carroll L. Tyler is AEC manager, with George P. Kraker in charge of the commission's Sandia affairs and Dr. Paul J. Larsen heading laboratory activities there under the direction of Dr. Norris E. Bradbury, head of the Los Alamos scientific laboratory.

Needless to say, the atomic age has wrought profound changes in the New Mexico landscape and on the pattern of business and social life. Nothing has been the same around Albuquerque since the huge Sandia operation began, and the same goes for southern New Mexico in the general realm of Alamo-

(Continued on page 86)

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DENVER REGIONAL

(Continued from page 84)

gordo and White Sands National Monument. Up northwest of Santa Fe where Los Alamos laboratories are located the economy has been loused up in general with housing frightfully scarce, prices of everything sky-high and everybody's employees in a nose-thumbing mood. Gradually the dust is settling and New Mexico is getting used to it all.

A superhighway soon to be built from Los Alamos to Sandia (Albuquerque) will spare the Santa Fe area much of its present traffic problem and enable Los Alamos scientists and workers to hurry to Albuquerque to see the latest Mickey Mouse comedies without suffering undue delay enroute. Sleepy old Santa Fe may regain a bit of its old composure and charm, in the process. Albuquerque, already recognizing itself as another Chicago or Los Angeles, is willing to take the cash and let the credit go.

Railroads vs. Railroad

Into the congealed railroad traffic picture has stepped the scrappy little Denver & Rio Grande Western line with a bold attack on the powerful Union Pacific and some 200 other American railroads.

What sounds at first like Don Quixote jousting with windmills is more than that, a lot more. D & RGW wants some of the juicy Idaho and Pacific Northwest business it claims Union Pacific is monopolizing. U.P. calls the smaller road's maneuver an "attempted invasion."

Maybe some manufacturers would like to get into this fight.

It costs only 60 cents to ship a hundred pounds of plaster from the big cement mill at Portland, Colorado (near Florence, on the Arkansas River above Pueblo) to American Falls, Idaho, via Denver. (Keep an eye on that \$500,000,000 Arco atomic development up that way.) But to ship it via Ogden, a more direct route, costs 86 cents. Union Pacific gives the "through" rate for the entire distance if it gets the long haul between Denver and American Falls, but if it gets only the short haul from Ogden to American Falls, with D & RG handling it the rest of the way, then Union Pacific won't play ball on a through rate.

D & RG complained to the Interstate Commerce Commission that U.P. won't participate in through rates on freight moving by way of the Ogden gateway. This forces shippers to use U.P. for many hauls on which they would prefer to use other roads, i.e., D & RGW.

U.P. counters that it spent millions of dollars developing facilities for serving

the northwest where no other road is available. It wants to keep its exclusive territory and claims it provides better service and rates to that territory than it could if it had to share part of the long-haul business with another railroad.

ICC and the courts have a nice issue to settle. D & RGW seems to be on the side of free and open competition, in this instance, and that is popular at the moment with most Americans who believe that competition is the life of trade and a healthy thing for the nation.

Metal Mining Coming Back

In a season brightened by the nudists' convention near Denver and the launching of the Denver Post's campaign to change the name of California Street (where its new building is located) to something with a Rocky Mountain flavor, it is heartening to see real signs of revival in the metal mining industry. Maybe we're premature. Maybe it is wishful thinking. But honest, it looks as if the sick man of the West is about to rise from his bed and take on some nourishment.

Lead prices have increased from the postwar low of 12 cents to 14¾ cents a pound, and both copper and zinc are moving in good volume.

Federal stockpiling plans insure greatly improved prices for a long list of metals. Don't call this a federal subsidy unless you want to discuss federal subsidies already received by the people who produce meat, potatoes and nearly everything else mining people buy. The fact they buy things at subsidized prices with "funny money" not related to the gold standard, makes mining men a bit wrothy. Tell them the current dollar has increased in value from 59 cents to 62 cents and they'll ask you what a dollar was worth back in the days when gold and silver were money, not just commodities.

In some rather important quarters, such as the pages of the Wall Street Journal, lengthy discussions are printed on the subject of a free market for gold and what the consequences might be. Everybody admits the men who produce gold would get, in a free market, at least twice the government's fixed price of \$35 a troy ounce. It is worth about \$80 an ounce in India now, where there is a free market.

Gold mining men feel like birds in a gilded cage, locked up by their own government. If they could only sell their product wherever it would bring the best price, they say, the whole world would be better off. There would be hell to pay, too, say other people who ought to know something about the subject. Anyway, gold miners don't want any

subsidies—all they want is a chance to sell to the highest bidder!

Quite apart from the talk of a free gold market, stockpiling programs and other matters hinged on government policy, the mining people are getting busier and busier with the business of digging for ore. Travel through the mining districts shows a surprising amount of activity going on, with many millions of dollars being invested in projects of many kinds.

The great Argentine Quadrangle above Silver Plume in Clear Creek County, Colorado, is being brought back to life. More than \$300,000 has been invested, most of it in driving a development tunnel to open up a vast body of lead and silver ores below the present Grizzly mine workings. Some miles away a larger amount has gone into de-watering and modernizing properties at Caribou, whence came the bricks of solid silver that paved the street the goggle-eyed General U. S. Grant walked on when he visited Central City and other Colorado mining camps in 1868.

The writer thought the current operations must be large-scale, low-grade ore propositions like Homestake at Lead (call it Leed), South Dakota, or Central City's Chain-O-Mines operation. But no, an operator from California's gold mining areas said the Colorado operations are finding as good ore as ever greeted H. A. W. Tabor or Tom Walsh.

"Very few of those old birds knew mining, scientifically." My informant admitted he is a graduate mining engineer. "We know a few tricks the people didn't know two or three generations ago. We save a lot of time and money by core-drilling, for one thing. And we find they overlooked a lot of good bets. Very, very good bets, indeed!"

Second Industrial Waste Conference

A second industrial waste conference for the Pacific Northwest is to be held this fall at Oregon State College, Corvallis, with Professors Fred Merryfield and Ernest Wiegand in charge of arrangements. The first one was held at the University of Washington in April,

Recent RFC Loans

April—Pacific Grape Products Company, Modesto, Calif., \$750,000; Wenatchee Foods Inc., Wenatchee, Wash., \$500,000.

Northrop Aircraft, Inc., Hawthorne, Calif., \$5,000,000; Carroll, Hillman & Hedlund, Inc., Seattle, Wash., \$3,025,000; Pictsweet Foods, Inc., Mt. Vernon, Wash., \$12,000,000.

June—J. R. Simplot Company, Boise, Ida., \$1,250,000; Pacific States Steel Corp., Niles, Calif., \$575,000; General Panel Corp. of California, Burbank, \$3,059,000.

THE WEST ON ITS WAY

ALASKA

ASPHALT TO ALASKA—Permanente Cement Co.'s steamship Diamond Cement has been chartered by Alaska Steamship Co. for transporting asphalt from San Francisco to Alaska. Charter is for three months, bareboat, with option for more time.

NAVY DISCOVERS NATURAL GAS—Natural gas has been found in commercial quantities near Point Barrow, the northernmost inhabited spot in North America, by the U. S. Navy. A well, South Barrow No. 2, about six miles south of Point Barrow, is producing sufficient fuel to meet requirements of the naval installations at Point Barrow.

NUCLEAR RESEARCH LAB PROPOSED—Possibility of building a high altitude nuclear research laboratory near the top of Mt. McKinley is presently under consideration. Office of naval research, University of Chicago, and the Boston Museum of Science are co-operating on this project. If established, it will be the highest cosmic ray observation post in the world.

ARIZONA

URANIUM PRODUCTION POSSIBLE—Hillside mine, near Prescott, has been ordered inspected by the Atomic Energy Commission for possible commercial production of uranium.

COTTON SEED PLANT—Western Cotton Products Co., at Lateral 17 and Buckeye Road, Phoenix, is having constructed a \$1,000,000 cotton seed processing plant, as well as four new cotton gins at strategic locations in the cotton-growing district. Completion of the new processing plant is scheduled for around November 1, in time to take care of the greatest cotton crop in Arizona's history.

NEW MANGANESE PROCESS DISCOVERED—Bureau of Mines has found a new development for processing low-grade manganese ores, which may open the way for a large new market. This discovery is an electrolytic method of processing such ores as those at Artillery Peak.

NEW UTILITY COMPANY—Northern Arizona Light & Power Co. is a newly formed subsidiary of Central Arizona Light & Power Co., and through it (N.A.L.&P.) the parent company has purchased part of the Arizona Power Co., whose physical properties will now be operated by the new subsidiary. Arizona Power Co. retains ownership of three generating plants (two hydro and one steam), but these too will be operated by the new subsidiary of C.A.L.&P. Electricity will be dispensed to a large area of northern Arizona, and manufactured gas handled in Prescott. Transaction involves properties in 23 communities.

CALIFORNIA

PACKER CHANGES—The former Welch Grape Juice Co. operation has changed hands to a new syndicate, known as San Leandro Packing. New firm is headed by George Clement of Schuckl & Co., Sunnyvale, and includes Schuckl & Co. and key personnel of that company. Transfer effected is on a lease with option to buy.

MANUFACTURER MOVES—Irving Subway Grating Co., Western division, will shortly be moved completely from Emeryville to a new and larger plant at 1819-10th St., Oakland. This firm manufactures open steel flooring, bridge decking, and grills.

HORMEL BUYS SITE—George A. Hormel & Co., food products packers, purchase a site in San Francisco on Evans St., near Army. No plans have been announced.

RUBBER PLANT BUILDS—National Motor Bearing Co., Redwood City, plans a new \$500,000 Arrowhead Rubber plant on an eight-acre site in Downey, Calif.

PACKERS MERGE—Los Altos Food Products Co., Mountain View, and Larry W. Teasdale, San Jose, merge into Teasdale Packing Co., with headquarters at Mountain View.

\$500,000 TRANSFORMER ORDER—Westinghouse Electric Corp. has received an order from Southern California Edison Co. for four 220,000 volt transformers valued at slightly less than \$500,000.

UNION OIL SPENDS \$5,000,000—Union Oil Co. of California plans a \$5 million research plant to occupy a 100-acre site near Brea, to replace the present research plant at Wilmington. Included are 12 buildings containing 120,000 square feet of floor space.

HEMET FIRM BURNS—Damage estimated at more than \$300,000 was left after a recent fire in Hemet, during which the orange packing house of Hemet Mutual Groves, Inc., were destroyed. An entire city block was in flames; several business houses were stricken.

P.I.E. SPENDS \$600,000—Pacific Intermountain Express Co. plans to spend \$600,000 for new equipment, including tractors, semi-trailers, and rebuilding of some of their equipment.

CALIFORNIA TOOTSIE ROLLS—Sweets Co. of America, Inc., Hoboken, New Jersey, has purchased property at 10151 National Boulevard, Los Angeles, in an expansion move. This new plant will be operated as divisional sales office and factory to serve the Pacific Coast with Tootsie Rolls and other Tootsie products.

SOUTHWEST AIRWAYS OVERHAULS—Southwest Airways Co. is reentering the aircraft maintenance business, having moved their overhaul shops from Phoenix to South San Francisco. At present the ships are handling all of the airline's equipment plus that of several other organizations, as well as overhauling instruments under a Navy contract.

GEN PETE EXPANDS—General Petroleum Corp. has begun construction on a \$2,250,000 refinery expansion project to turn more surplus heavy fuel oil into other petroleum products in greater demand.

CHICO LUMBER FIRE—Fire in the Chico Wood Products Co. recently destroyed an estimated 3,000,000 board feet of lumber, valued at \$150,000, and a \$20,000 dry shed.

K & E EXPANDS—At a cost of over \$500,000, Keuffel & Esser Co. is renovating the firm's plant at 1320 Margo St., Los Angeles. A two-story brick building is being added to the property.



• New Los Angeles plant to be built by Lever Brothers Co., on a 30-acre tract at Anaheim Telegraph Road and Washington Boulevard. Construction cost is \$25,000,000; permanent employment will be given to more than 600 persons, who will handle raw materials and finished products at the rate of 180,000 tons per year.

BIG STEEL CONTRACT—San Diego plant of National Steel & Shipbuilding Corp. has a \$250,000 contract to build a fleet of five welded steel shrimp trawlers for Pesquera Topolobampo, S.A., large-scale Mexican commercial fishing firm.

WAREHOUSE FIRE—Pier 54 Annex, San Francisco, was the scene of a recent fire which gutted a packing and crating warehouse, leaving damage estimated at \$150,000.

PAINT PLANT BURNS—Kunst Bros. paint factory, 419 Bayshore, San Francisco, was recently destroyed in a \$250,000 blaze.



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THE WEST ON ITS WAY

POWERFUL CONTRACT—Pacific Airmotive Corp. has entered into a contract with Flying Tiger Lines, Inc., to provide Pratt & Whitney R-2000 engines under a "leased power" arrangement.

LABOR-MANAGEMENT STUDY—A grant of \$1,000 growing out of a will left by Marine Lt. Benjamin Toland, killed on Iwo Jima, has been awarded to Dr. John P. Troxell of the Stanford University faculty for a study of labor-management relations. Toland left 20 per cent of his estate to N.A.M., and selection of Dr. Troxell was made by a group of educators headed by Dean Donald David of the Harvard Business School.

AIRCRAFT MAINTENANCE—Oakland Airmotive Company, located at the Oakland airport, is a new firm in the aircraft maintenance business, equipped to service planes from the smallest up to and including DC-4's.

AIR CONDITIONING—Carrier Corp., Syracuse, New York, plans formation of a new firm, C. E. Howard Corp., with Carrier as principal stockholder. Business of C. E. Howard Corp. will be taken over. Firm in Southgate manufactures the recently developed Kelly-Howard concentrator.

KAISER NAME CHANGE—Kaiser Company, Inc., largest steel producer in the West, changes name to Kaiser Steel Corp.

PAPER PLANT PLANNED—Western Waxed Paper Co., division of Crown Zellerbach, has made financial arrangements with Mutual Life Insurance Co. of New York for construction of a factory and office building at Sheila St. and Leo Ave., Los Angeles. When the new plant is completed, the firm will move its Los Angeles operations from present quarters at 910 E. 61st St.

LOOK—NO OIL NEEDED!—Colaco, a new metal manufactured by the Colaco Corp., Los Angeles, requires no lubrication when made into bearings and bushings. Silver, lead, and copper are mixed—not as an alloy, according to the firm, but as a solidified emulsion of the three metals. The new metal is easily machined, requires no cutting lubricant. Melting point is 1800 degrees F.

SALESMANSHIP has been dead for 10 years!

Growing competition makes it imperative that management take immediate steps to re-train salesmen to again use aggressive selling tactics. To supply this need, Rockett Pictures has produced a hard hitting Series of eight Sound Slide Films titled, "AGGRESSIVE SELLING."

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3. "The Attitude That Gets Business"
4. "What Do You Sell?"
5. "Are Prospects Really Different?"
6. "Pride in Price"
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THE WEST ON ITS WAY

COLORADO

WHERE TO SELL URANIUM—U. S. Atomic Energy Commission announces that certain types of the so-called high-lime uranium-vanadium bearing ores of the Colorado plateau will be purchased at its Monticello purchase depot under special agreements to be negotiated with individual producers. Provisions incorporated in these agreements will differ from those set forth in the Commission's Domestic Uranium Circular No. 5.

\$15 MILLION PAPER MILL—Columbine Development Company, a newly formed firm, is contemplating spending 15 million dollars to obtain timber and build a plant on the Colorado River below New Castle. This proposed mill would produce 240 tons of newsprint and sulfate pulp per day, 300 days a year. Preston Walker, Grand Junction Sentinel general manager, is president of Columbine.

SHALE-OIL PLANT—First shale-oil plant in the U. S. has been completed, and is now producing. It is designed to produce gasoline, diesel fuel, heating fuels, and fuel gas from crude shale oils extracted at the Bureau of Mines' oil-shale demonstration plant. All the Bureau of Mines' installations near Rifle will be on exhibition Sept. 20 and 21.

LEADVILLE TUNNEL REJUVENATED—Senate appropriations committee has agreed to authorize expenditure of \$500,000 this fiscal year to renew work on the Leadville drainage tunnel. Mining experts say that completion of this tunnel (estimated at three years, at around another \$1,700,000) would open ore bodies containing one billion pounds of lead, zinc, and manganese.

IDAHO

U.P. TO LAY RAILS 1,000 MILES—Union Pacific's northwest division is about to be extended from Pocatello to Granger, Wyoming, and Butte, Montana, an addition of about 1,000 miles of trackage.

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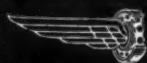
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THE WEST ON ITS WAY

MAJOR BIDS AT ARCO—Bids on the first major work at the projected Arco nuclear reactor testing station, now in planning stage, are expected to be issued this fall. Allan C. Johnson, assistant to the president of Vermilya-Brown Co., builder organization, has been named director of the project's engineering and construction division.

MONTANA

KALISPELL ELEVATOR—Kalispell Feed & Grain Supply, Inc., has completed a new 35,000 bushel grain elevator, containing 17 storage bins and modern cribbing facilities. A new 20-ton Fairbanks scale is incorporated.

OIL TO CANADA STOPPED—Toronto Pipe Line Co., north of Cut Bank, has stopped piping oil to British American, Canadian purchasing agent. Indication is that Canadian oil production is starting to compete with U. S. oil imports.

KALISPELL LUMBER CO. BURNS—A planing shed, warehouse, garage, and other small buildings of Kalispell Lumber Co. were recently destroyed in a fire, with damage estimated at \$100,000.

NEW MEXICO

ATOMIC PROJECTS PLANNED—Projects now in the planning stage for 1950 and later, at Sandia Base, near Albuquerque, will total \$15 million, according to officials. 78 private contractors are now at work there.

OREGON

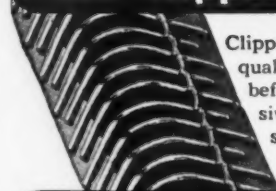
KAISER SHIP REPAIR CLOSES—Consolidated Builders, Inc., shipbuilding and repair enterprise at Swan Island in Portland under Kaiser management, has ceased operation.

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PLYWOOD MILL—Oregon-Washington Plywood Co., at Tacoma, is to be dismantled and moved to their Garibaldi, Oregon, plant, to afford the firm greater efficiency in use of equipment as one unit, and be close to the company's raw material supply in the Tillamook area.

LUMBER FIRE—\$250,000 worth of damage was suffered by the Clear-Fir Products Co., a lumber manufacturing firm in Springfield, recently. Their main mill, lumber stocks, planer, resaw and gang-saws were destroyed.

UTAH

WASATCH OIL LEASES WAREHOUSE—A large warehouse at \$120 Lincoln will be converted into a combination office and warehouse for Wasatch Oil Co.

MINES CLOSE—Silver King Coalition Mines have shut down operations, affecting about 400 men. New Park Mining Co. and Park Utah Consolidated Mining Co., have also announced cessation of operations because of a breakdown of negotiations with Progressive Metal Workers Council, an affiliate of CIO. New Park operation puts 250 men out of work; Park Utah affects 225 men.

POSSIBLE COAL PROCESSING PLANT—Provo is being considered as the site of a coal processing plant, because of its proximity and rail service to Carbon County coal fields. Western Chemical & Refining Co., Salt Lake City, is interested in locating the plant in Provo.

OIL PLANT BLAST, FIRE—A huge oil tank storing 1,500,000 gallons of oil at Utah Oil Refining Co., Salt Lake City, was engulfed by fire which followed a tremendous explosion from the top of the tank, recently. Damage was estimated between \$25,000 and \$30,000.

WASHINGTON

PERLITE PLANT—Fittex Insulation Co., St. Helens, has started operation of their new perlite processing plant at Freida.



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FOR HARDNESS AND WEAR RESISTANCE AT RED HEAT use VICTOR H56. Similar to VICTOR H51, but more ductile. Use it for exhaust valves; blanking, forming and trimming dies; cams, hot punches, and parts subject to corrosion, abrasion, heat, and impact.

WHERE SEVERE ABRASION IS ENCOUNTERED, use VICTORTUBE. Contains tungsten carbides of varying screen sizes in steel tube. Designed for either acetylene or electric application, and recommended for scarifier teeth; dredge cutter blades, posthole augers, oil field tools and equipment, and other like tools.

FOR THIN CUTTING EDGES such as coal cutter bits, brick augers, pug-mill knives and similar tools, use **VICTOR TUNG-SMOOTH.** Similar to VICTORTUBE, but tungsten carbide particles are of varying fine meshes incorporated with a flux allowing smooth and thin deposits. For acetylene application.

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THE WEST ON ITS WAY

OIL FIRM PLANS PLANT—Pennzoil Company plant to build a branch office, warehouse, and bulk storage plant in Spokane in the E3500 block on Green, between Main and Riverside. Walter E. Martin, of W2823 LaCrosse has been named manager of the Spokane office.

BARGE SERVICE TO ALASKA—Anchorage Transportation Co., a newly established firm with temporary headquarters at Pier 50, Seattle, plans a new Seattle-to-Anchorage, Alaska, tug-and-barge contract-carrier service. The tug Myrtle E. Wilson will be used to tow two large steel-covered barges, leased from the Alaska Railroad, carrying government freight from Seattle to Anchorage.

NEW FISH COMPANY—Kaakinen Fish Co., Westport, has a 15-year lease on a Port Orford, Oregon, dock. Construction has started on a three-line cannery, which will be ready for operation in December. Salmon, crab, and tuna will be packed.

\$800,000 HEPPNER GRAIN FIRE—Grain storage and handling facilities, as well as 190,000 bushels of grain, were destroyed recently at Heppner, with loss estimated at \$800,000.

COAL DRYER INSTALLED—Northwest Improvement Co., at Ellensburg, is installing a new type drying service for drying minus-quarter inch coal at the central washing unit, at Roslyn. This will enable the firm to supply large concerns with high grade small-size coal with a moisture content cut to 4 per cent. It will handle 50 tons per hour.

PERMANENTE METALS BUYS PLANTS—War Assets announces sale of three government-owned aluminum plants to Permanente Metals Corp. for \$36,000,000. Properties include Mead aluminum reduction plant at Spokane, which cost the government about \$24,000,000, and has an annual capacity of 216,000,000 pounds; Trentwood rolling mill, also at Spokane, which cost the government about \$47,000,000 and has an annual capacity of 288,000,000 pounds. Third plant is in Baton Rouge, Louisiana. Previously, Permanente had purchased from the government a small aluminum plant at Tacoma, Washington, and a fabricating plant at Tacoma, Wash., and a fabricating plant at Newark, Ohio.

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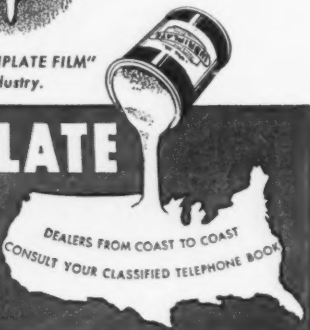
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THE WEST ON ITS WAY

DUSTLESS OPERATION—Northwest Magnesite Co., at Chewelah, is to install a new electrical precipitator to remove dust from their plant operations. Work is expected to be completed this year.

DECAL FIRM CHANGES—Lindgren Bros., W902 Broadway, Spokane, have made a major change in their operation. Henceforth, the firm will be known as Lindgren-Turner Company, whose operation will be confined to the manufacture of decalcomanias only. The firm's commercial advertising and sign production departments have been turned over to two former employees, now operating under the name of Miller & Calkins Silk Screen Process Productions.

WYOMING

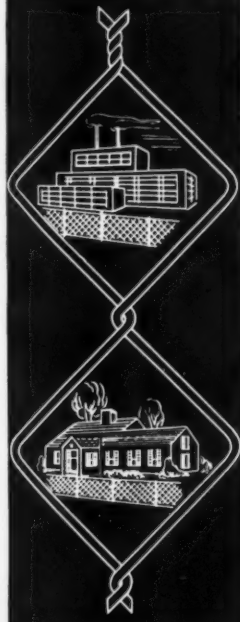
PIPELINE DENIED—Public Service Commission of Wyoming has denied a permit for an \$8,419,880 natural gas pipeline to run from Wyoming to Baker, Montana. Joint application of the Montana-Dakota Utilities Co. and Montana-Wyoming Gas Pipe Line Co. was refused because the state commission believed it had no authority to grant it. The two firms plan a 340-mile line to connect Wyoming's Worland area with Baker.

PIPELINE REQUESTED—Stanolind Pipe Line Co. has applied for permission to construct and operate (1) a pipeline from the Salt Creek field to the new Taylor-Sussex field; (2) a gathering system in the Taylor-Sussex field. The former line is 14 miles long.

NEW RAIL STATION—Burlington Railroad plans to start construction immediately on a new station for Worland. Riedesel-Lowe Co., Cody, has the building contract.

TO COMBAT SNOW AND BLOW—Union Pacific Railroad is building a few more miles of snow fence in Wyoming, at a cost of around \$325,000. Plans call for 38,000 lineal feet of wood snow fence, and nearly 21,000 lineal feet of corrugated iron snow fence. A large part of this new construction will be in Carbon County, where last winter's blizzards were the worst for this road.

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WESTERNERS AT WORK

California



O. L. Gray, general manager of Santa Fe Railway's eastern lines, succeeds E. E. McCarthy as general manager of Santa Fe's coast lines. McCarthy, who has served the road for more than 49 years, retires from active duty.

J. R. Ellis elected vice president of Sunray Pipe Line Co., subsidiary of Sunray Oil Corp.

T. G. Hughes becomes executive vice president of Oronite Chemical Co., and B. E. Anthony named secretary-treasurer.

Kenneth F. Brooks appointed plant engineer of the El Segundo plant of Nash-Kelvinator Corporation.

F. S. Wade steps out of the position of general manager for Southern California Gas Co., but he will continue as the firm's president and chief executive officer. F. M. Banks named general manager; W. M. Jacobs elected a vice president in charge of sales, advertising, and customer service and accounts; Frank Foster becomes manager of residential sales.

Frank DuPont, formerly with Pickering Lumber Corp., becomes manager of David Ostin Moulding Co.'s pine department, Sacramento.

Julian Bartlett named superintendent of Matmor Canning Co., Woodland, succeeding Gus Arzino, resigned.

Clarence W. Ford appointed Pacific district building project specialist for General Electric Co., with headquarters at Los Angeles.

J. H. Sembower named to fill Shell Oil Co.'s newly-created office of assistant to executive vice president, with responsibility for public relations activities on the Pacific Coast.

Fred T. Abbey, appointed general manager of Lassen Lumber & Box Co., Susanville, succeeding the late H. W. Bridgford. Abbey was formerly the operator of Mt. Lassen Hotel.



H. S. Worthington appointed assistant to the vice president in charge of operations, for Columbia Steel Co. Worthington will work closely with O. L. Pringle, new vice president in charge of sales, and Laurence S. Dahl, new vice president in charge of operations, in coordinating customer requirements with the firm's steel products and operations. He will also be concerned with development of new steel products.

Charles A. Glass resigns as vice president and Western sales manager for Monarch Finer Foods, to devote full time to his fish canning and marketing interests. He is president of Ocean Fisheries, Inc., vice president of San Diego Packing Co., and vice president of E. M. Darrimon Co., Los Angeles.

Charles L. Brewster, northern district drilling superintendent for Standard Oil of California, retires after 40 years in the business, 28 of them with Standard. He is succeeded by F. A. Heitmeyer.

Robert Stewart, formerly a chemist with Sutter Packing Co., appointed head of quality control for Santa Clara Packing Co., San Jose.

Ralph K. Paine appointed manager of Standard Oil of Calif.'s pipe line department, upped from general superintendent of the southern California district of the pipe line department. He replaces Clyde A. Swigart, who was elected a vice president of the Trans-Arabian Pipe Line Co. L. E. Jones succeeds Paine as southern district general superintendent.

Frederick B. Whitman elected president of Western Pacific Railroad, succeeding H. A. Mitchell. Harry C. Munson elected vice president and general manager; Henry E. Poulterer, vice president in charge of traffic; C. L. Droit, secretary; Roy E. Larson, treasurer; L. J. Gosney, general auditor; Logan Paine, assistant secretary; and A. F. Rintala, assistant treasurer.

W. D. Reis elected president of El Dorado Oil Works, largest producer of coconut oil in the United States.

William W. Moreland, Jr., appointed vice president in charge of manufacturing, of Conrac, Inc., Glendora, manufacturers of television receiving sets.

Dr. Donald R. Scheuch appointed a research associate in the department of electrical engineering of Stanford Research Institute.

Ernest Clover joins Triad Transformer Manufacturing Co., Los Angeles, to head the Geophysical Transformer Division of the firm.

H. K. Jones appointed purchasing agent for Alaska Steamship Co., succeeding Robert Mooney, who recently left the company.

T. W. Simmons, Jr., elected vice president and general manager of Johnston Pump Co., Los Angeles. Kenneth G. Lundie appointed general sales manager.

Sam Hench named West Coast manager of Best Foods, Inc., refined oil department.

H. Bailey Little, becomes sales manager of Coast Manufacturing & Supply Co.'s textile division, at Livermore. The firm will shortly start manufacture of Trenarno glass fabrics.

Health reasons prompted Jack E. Waldie to relinquish the post of general manager for Golden State Co., Ltd., and return to his previous position of Northern California manager. Harold A. Sloan, northern division manager, will devote full time to the office of ice cream department manager.

Andrew S. Halley, formerly a manager of Price, Waterhouse & Co., San Francisco, appointed treasurer of Paraffine Companies, Inc.

Frank E. Titus, Pacific Coast manager of the B. F. Goodrich Co.'s replacement tire division, retires from the firm. He is succeeded by Lawrence T. Greiner, who formerly held a similar post in Kansas City.

G. M. Giannini & Co., Pasadena aircraft parts firm, names Kingsley Y. Rogers as operations manager, and Paul Oling as manufacturing manager.

Laurance H. Cooper appointed vice president and general manager of Pacific Airmotive Corp., upped from vice president in charge of PAC's eastern division.

Frederic W. Riddington appointed manufacturing engineer of the heating division at the General Electric Co.'s Ontario works.

Colorado

George Hirsch, Denver, succeeds George Rienks on Oct. 1, as chief engineer of the Great Western Sugar Co.



Rolle Rand, executive director of the Colorado Resources Development Council, Inc.

Pittsburg & Midway Coal Mining Co. opens an office in the Security Life Bldg., Denver, with W. G. Joyce in charge as Western manager.

Idaho

Compton I. White, Jr., elected president of Whitecliff Mining and Development Co., Clark Fork, Idaho. W. W. Von Canon is vice president, and Compton I. White, Sr., is secretary-treasurer.

Bert W. Robinson retires as vice president and treasurer of Utah-Idaho Sugar Co. T. W. Cockayne, secretary, promoted to secretary-treasurer; Douglas E. Scalley upped from vice president and general manager to executive vice president and general manager; Douglas W. Love promoted from sales manager to vice president and sales manager.

Nevada

Harvey Glover appointed mill superintendent for Copper Canyon Mining Co., Battle Mountain.

New Mexico

Pittsburg & Midway Coal Mining Co. opens an office at 737 South Second St., Raton, with John F. Ferguson in charge as assistant Western manager.

Oregon

Franklin T. Griffith elected president of Donald M. Drake Co., Portland, succeeding the late Donald M. Drake, founder of the firm. Donald G. Drake, son of the founder, elected vice president.

Millard M. Robinson is superintendent of the new sawmill at Roseburg, Oregon, recently completed by Associated Plywood Co. of Eugene. Dale Williamson is mill foreman.

James F. Bell upped to Portland Gas & Coke Co. vice president.

Utah

T. P. Billings, manager of Western mines for United States Smelting, Refining and Mining Co., Salt Lake City, becomes consulting engineer for the firm. Arch G. Kirkland, assistant manager of mines, succeeds Billings as manager.

E. T. Stannard, president of Kennecott Copper Corp., retires at the end of the year to be succeeded by Arthur D. Storke, now president of Climax Molybdenum Corp. Stannard will remain with the firm as director and consultant. Arthur H. Bunker, a general partner of Lehman Bros., New York, elected president of Climax Molybdenum Co. to succeed Storke in that position.

Washington

E. J. Watson, general manager of Pictsweet Foods, Inc., and B. T. Jones, secretary, have been upped to vice presidents of the firm.

Frank Dowswell appointed production manager of the roll forming division at the Trentwood aluminum rolling mill.



When ALCOA'S new rod and bar mill, now under construction at Vancouver, Wash., is completed late this year, the presently operating plant will then be known as the reduction division of the Vancouver works. C. S. Thayer, works manager for reduction operations at the present plant, will become overall chief of the new rod and bar mill, with title of Manager of Vancouver Operations. E. D. Mairs, assistant works manager at an eastern plant, has been named works manager at Vancouver. R. W. Knapp, also transferred from an eastern post, will become assistant manager of the fabricating division. B. H. Sloane, production manager of the Vancouver works, will become works manager of the reduction division, which makes pig aluminum, and C. T. Heins will become his assistant.

Rey Maynard, formerly with Pratt-Low Preserving Co., of Santa Clara, Calif., named to post of general manager of Wenatchee Foods, Inc.

Following changes reported in the Simpson Logging Co.: All companies in Mason and Grays Harbor Counties were consolidated under the name of the Shelton Working Circle, with C. H. Baker as manager;

C. E. Runacres, Sr., comptroller; and George L. Drake, who has been Grisdale division manager, were named vice presidents of the firm. C. H. Kreienbaum, vice chairman of the board, took active charge of the Klamath division at Klamath, Calif. The top level of management now consists of three operating men—Kreienbaum, Bacon, and the general sales manager (to be named later), and four administrative men—Runacres, Sr., Drake, T. C. Rowe, treasurer, and John A. Priest, secretary.

Gilbert G. Mellis, Tacoma, appointed assistant manager of Simpson plants in McCleary.

W. R. Carter, manager of Standard Oil of Calif.'s Seattle branch, promoted to assistant manager of Seattle district. His territory now includes Western Washington and Alaska.

Lloyd C. Shackelford named a wire and cable specialist for the construction materials department of the General Electric Co., with headquarters at Seattle.

Wyoming

William R. Waggoner, gas superintendent for Pure Oil Co., transferred to Worland, where he will serve as gas superintendent of the Rocky Mountain division, and be in charge of construction and operations.

Glenn Nelle joins General Petroleum Corp. as assistant manager of Rocky Mountain operations. He will be located at the firm's Casper office.



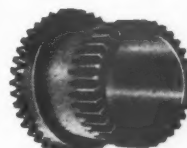
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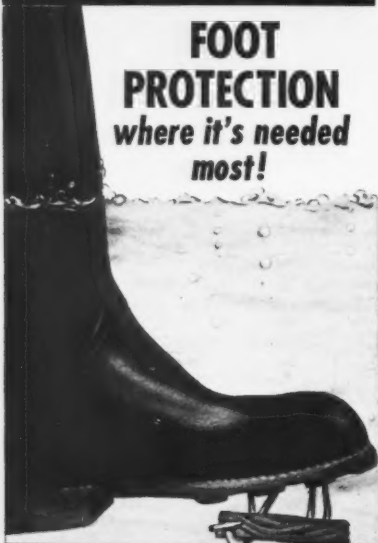
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Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials



Elliott A. Allen joins the American Chain & Gear Co., 5511 Pacific Blvd., Huntington Park, in charge of sales. A. C. & G. manufacture cut tooth sprockets and gears, and are also contractors of machine work up to 76 inches in diameter. "Union" chain and "American" gears and sprockets are stocked.

Swett-Stone Corporation recently moved their Mission Street office and warehouse to 770 Folsom Street, San Francisco. Manufacturers represented include: Manning, Maxwell & Moore, Inc.; Consolidated Safety Valves, Ashcroft Duragauges, Hancock Valves, American Temperature Instruments; Mason-Neilan Regulator Co.; Reducing Valves, Pump Governors and Automatic Control Equipment; Cunningham Manufacturing Co.; Air Whistles, Solenoid Valves; Ilg Electric Ventilating Co.; Blowers, Fans, Unit Heaters; Cuno Engineering Corp.; Engineered Filtration, Auto-Klean, Flo-Klean Micro-Klean; National Engineering Products, Inc.; "Copaltite," Plastic Metal.

W. T. Billard, Inc., manufacturers' representative for materials handling equipment, has recently completed plans at their plant, 734 East Third St., Los Angeles, Calif., to service all Automatic Transportation Co. trucks in their territory on what they call a Preventive Maintenance Service. This plan entails a monthly check on the operation, thoroughly going over the trucks, greasing and replacing parts, overhauling equipment, and general service to insure longer life and continuous, efficient service. This firm is also the southern California representative for Lyon-Raymond Corp., manufacturers of hydraulic and single stroke mechanic hand lift trucks, hydraulic die tables, and sheet feeding tables.

D. M. Williams, former Pacific division manager for Penflex Sales Co., division of Pennsylvania Flexible Metallic Tubing Co., transferred to Cleveland office. C. F. Taylor named to succeed him.



Charles S. Conrad, formerly general manager of sales for Columbia Steel Company, resigns that position to accept appointment as director of steel sales for Tay-Holbrook, Inc., San Francisco, distributor of industrial sheet metal and plumbing supplies.



Robert E. Sexmith named West coast manager for Ansul Chemical Co., headquarters at Los Angeles. By mutual agreement the Ansul Chemical Co. of Marinette, Wisc., will offer sales and service for Ansul Dry Chemical Fire Extinguishers in the Pacific Coast states, formerly served by the

Snowden Chemical Co., Modesto. West coast offices have been opened in Fresno and Oakland also.

Bernard J. Egan named district manager in Seattle for Revere Copper & Brass, Inc., covering the Northwest. Egan replaces H. O. Howard, who is transferred to Dayton, Ohio, as district manager there. Until this move, Egan was in the sales department of the firm at Rome, New York.

F. E. Warnes becomes director of sales promotion of Turco Products, Inc. with headquarters in Los Angeles.

H. D. Nickle appointed by Combustion Engineering-Superheater, Inc., as manager of the new district office for the northwest territory, with offices in the Skinner Building, Seattle. His jurisdiction will include the states of Washington and Oregon.

Dick Rivers named West coast sales manager for Mastic Tile Corp. of America, with headquarters at the Los Angeles plant.

William R. Wiley appointed sales engineer for McCullough Tool Co., with headquarters at the firm's Los Angeles office.

West Coast Foundry Equipment Co., Los Angeles and San Francisco, recently appointed California distributors for Young Bros. Oven Co., Detroit, manufacturers of industrial and heat treating ovens.

A. H. Flack named sales representative for Acme Steel Co., in Vancouver territory, where he will serve under Oswald Glenning, manager of Vancouver office.



Leetate Smith appointed general sales manager for Palmer Mfg. Corp., Phoenix. He is an active member of the National Federation of Sales Executives and director of the Arizona Sales Executives Club.

General Electric Co. forms a new Northwest sales district for the construction materials department. Known as the tenth national district, it will serve the wholesale trading areas of Seattle and Spokane, Washington; Portland, Oregon; Boise, Idaho; Salt Lake City, Utah; Butte and Billings, Montana. William W. Bryan named district manager. Construction materials department has also opened a new Pacific district warehouse at 3000 E. 46th St., Los Angeles, with Daniel F. Flynn as Pacific district manager. George F. Kingshot named operating manager, for the warehouse.

Smith Equipment Co., Great Falls, Montana, appointed distributor for Watson-Brown-Lipe auxiliary transmissions, and has a complete stock of service parts.

E. C. Bueher Associates, 527 Folsom St., San Francisco, appointed exclusive distributors in Northern California for Albion Industries, Albion, Mich., line of light and heavy duty industrial casters.



F. Ashton Smith appointed foil product manager at The Permanente Metals Corporation, to direct sale of their Kaiser Aluminum Foil.

James W. Moller appointed Pacific Coast division manager of the John F. Jelke Co., Chicago, manufacturer of "Good Luck" margarine and other food products. This appointment follows completion of recent arrangements between the Jelke Co. and Simon Levi Co., Ltd., Los Angeles, for distribution of these products on the West Coast. Moller will have complete charge of all sales and merchandising for the Jelke Co. in that area. Headquarters are in Los Angeles.

Hines Bearing and Industrial Supply Co. of Billings, Montana, appointed distributor of Hewitt industrial rubber products in Billings and surrounding territory. The firm has a complete stock of Hewitt hose and belting for prompt service.

Wayne McCarthy promoted to position of north coast regional manager of the Minneapolis-Honeywell Regulator Co., succeeding John B. Banks, resigned. This area, with headquarters in Portland, includes the region surrounding that city as well as Seattle, Spokane, and other Washington and Oregon cities.

Campbell Hardware and Supply Co. are moving into new quarters at Airport Way and Spokane St., Seattle 4. Official opening is September 14, 15, 16, during which time they will stage an industrial tool exposition.

California Wire and Cloth Corp. moves into new Seattle warehouse at 3434 Second Ave. S. These quarters will serve customers of CWC Co., Colorado Fuel and Iron Corp., the parent company, and Wickwire-Spencer Steel division, in the Northwest and Alaska.



White Motor Company appoints William C. Hagens, right, as wholesale manager for the San Francisco area. Joe C. Knapp, left, formerly with the San Francisco and Los Angeles branches of the firm, will be transferred to Portland to take Hagen's place.

Allis-Chalmers appoint following: Western Machinery Co., Phoenix, Ariz., for centrifugal pumps; Associated Wholesale Electric Co., Los Angeles, for motors, controls, transformers, and circuit breakers; Bay City Bearing Co., Long Beach, for motor and controls. In addition, the Baker Electric Co., Denver, Colo., is named a certified service shop for Allis-Chalmers motors, controls, and transmissions.

Industrial Supply Co., Inc., Salt Lake City, appointed distributors for Nelson Stud Welding equipment in the states of Utah, Montana, and portions of Idaho, Wyoming, and Nevada.

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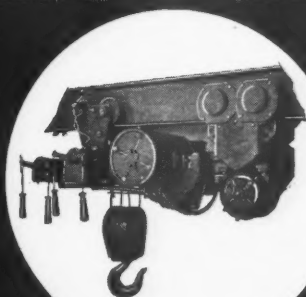
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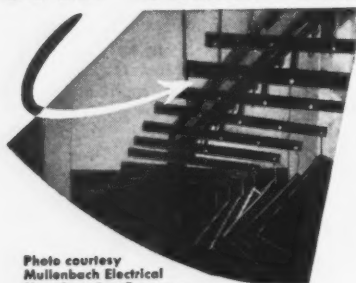


Photo courtesy Mullenbach Electrical Manufacturing Company

Conveyor line carrying freshly painted electrical equipment through 375° F. needs only two greasings a year with DC 41 Silicone Grease.

Burned out conveyor bearings and grease dripping on freshly painted electrical equipment were two major drying oven problems confronting engineers of the Mullenbach Electrical Manufacturing Co. of Los Angeles. At a temperature of 375° F., the best organic greases failed and weekly relubrication was essential to keep the conveyor system operating. Even then bearing failures were common.

Acting upon the advice of a Dow Corning sales engineer, Mullenbach cleaned and repacked the conveyor bearings with DC 41 Silicone Grease. Now, after more than two years of silicone lubrication, bearing failures are unknown. Relubrication twice yearly is all that is required to keep the conveyor working perfectly.

DC 41 Silicone Grease is being specified by more and more manufacturers to solve lubrication problems involving high temperatures. If such a problem exists in your plant and you'd like to know more about this heat resistant silicone lubricant, write today for data sheet No. AJ9 or phone the branch office nearest you.

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Lumber Story For Schools

THE problem of how to get an industry's story presented to the schools in an impartial, objective manner that will incidentally help to offset destructive propaganda from other sources, the West Coast Lumbermen's Association has come up with a workable answer.

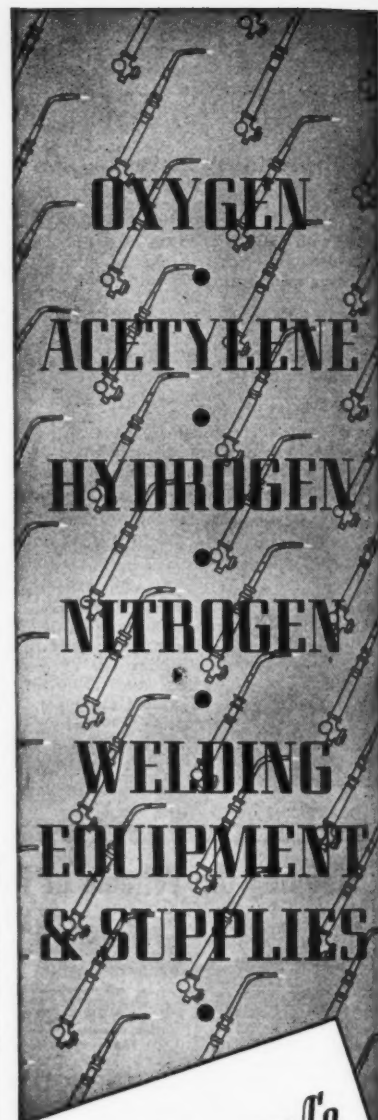
They have selected a "Forest Industry Book Shelf" of 12 widely recognized books which tell the story of forestry, logging and lumbering interestingly and factually. Their members are invited to purchase the books to give to the high schools in the areas where their plants are located. The regular list price for the set is \$40, but by arrangement with J. K. Gill Company of Portland for quantity purchase they have obtained a quantity discount of 25%.

It was discovered that high schools with fine physical recreation and athletic facilities have pitifully bare shelves in their school libraries in far too many cases, and funds for purchasing books seem extremely limited. When approached to see if they would accept recognized books, not special publications prepared to serve a propaganda purpose, school boards responded with great interest. A mailing to lumber companies to ascertain whether they would be willing to provide sets for their schools brought a 65 per cent acceptance.

By next fall the West Coast Lumbermen's Association expects to have the books in 200 high schools. Incidentally, the idea has greatly interested book publishers, who see an opportunity for far wider distribution of books descriptive of industry than ever before. Some of these books were written by people who had been invited by the Association to visit the lumber industry in the West and see things for themselves, with the request that they do an objective job, such as, for instance, not bemoaning the sight of a recently logged-off area until they had seen the progress toward reforestation in other land where the timber was cut five, ten, and 20 years ago.

Furniture Engineering

Three courses in furniture engineering will be given this fall at the University of California, Los Angeles Extension. Instructors and their courses are: materials and design: John J. Keal, design chief, Beverly Hills Customs Furniture Co.; production: Robert G. Engel, general mgr., Progress Furniture Manufacturing Company; wood technology: Arthur Koehler, wood utilization consultant.



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OPPORTUNITY SECTION

Surface Finish Is An Important Factor

Product failures that occur in final performance tests are frequently found to be the result of improper surface finish. Corrective procedure, in most instances, is an expensive one of advising the machine operator that a better finish is required, and of reworking the defective part if possible.

Precise surface finishing operations once could be completely ignored. But the trend from skilled craftsmen and simplicity of design to machine operators and complexity has made proper designation and control of surface quality a vital design consideration.

The machine operator is not to be blamed for failures, for not even a skilled craftsman could be expected to produce surfaces that can meet the requirements now made possible through improved manufacturing technology.

Only the designer who creates a new mechanism can be expected to know which surfaces of each part are critical and require special finishing. It is up to the designer to specify on the drawing the required finishes with sufficient precision to assure that the parts will function properly.

So indicates James A. Broadston, of North American Aviation, Inc., who is Propulsion Test Group Leader of the firm's Aerophysics Field Laboratory in Los Angeles.

New Firm Enters Materials Handling Field

Calabar Corporation has recently been formed to manufacture and sell nationally a new line of equipment especially adapted to the materials handling field. This firm, headed by Dorance D. Bolton will have headquarters at 8414 Otis Street, South Gate, California.

Highlighting the line is a compact, powerful Fluid Tractor for monorails and overhead cranes. Unlike any other on the market, the Calabar Fluid Tractor will be popular in all types of industry.

Several other products are in the final stage of engineering and testing in the field. These will be ready for announcement to the trade in the near future.

The Calabar Corporation personnel consists of Dorance D. Bolton, president; Russell J. Leek, vice-president-secretary in charge of sales; Arthur Boyd, member of the board of directors,

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